

# INFO WORLD

The Voice of Client/Server in the Enterprise

## Apple to build 3-D browser

■ Tool simplifies Web data visualization

By Tom Quinlan

APPLE COMPUTER INC. is readying a series of initiatives aimed at corporate sites that it hopes will prove that Apple's products, not its survival, are the subject of the day.

Apple's Meta Content Format, code-named Project X, to be used in a data browsing tool, is designed to give users graphics-based access to

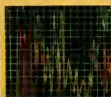
the increasing amount of data being stored on the World Wide Web.

Apple President and CEO Gilbert Amelio, offering glimpses of the project at last week's Macworld Expo show in Boston, said the Meta Content Format can transform HTML-based data into a multilayered graphics presentation that lets

▷ APPLE page 24

## WINDOWS NT. PROGRESS, BUT NOT PERFECTION

Windows NT 4.0 has finally arrived. In its bid to be the desktop OS of champions, NT Workstation has made great strides but falls short in



CPU usage in NT's Task Manager

key components. Meanwhile, Internet tie-ins and bundled apps make **NT Server 4.0** stronger than **Version 3.51**, but it can't match NetWare in file-and-print or directory services.

**Bottom line: Version 4.0 is much improved but remains dogged by NT promises. See page 97.**

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**Programmer as hero? Not so, says Strehlo.**  
**Good practices, not heroics, help**  
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**Clearing the Air: How Air Products**  
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**with a complete network overhaul. 68**

## HP shapes unified servers

■ Systems will set table for joint RISC/Intel board initiative

By Deborah DeVoe

TAKING ITS FIRST concrete step toward a unified RISC/Intel architecture, Hewlett-Packard Co. will announce next month midrange HP 9000 K-Class servers that will later support a board upgrade to the Merced processor architecture HP is building jointly with Intel Corp.

HP's Computer Systems Organization (CSO) will announce Sept. 17 both the HP 9000 K-Class sys-

tems and a high-end T-Class server based on the company's new 64-bit PA-8000 chip.

Due to ship in early September, the K-Class systems will be capable of later supporting Intel's Merced architecture with a board upgrade, said Dick Watts, vice president and general manager of CSO, in Cupertino, Calif.

Merced, due by late 1998, according to sources, will be a 64-bit

chip capable of supporting both Unix and Intel-based applications. Previously, HP has said it hopes to provide binary compatibility with existing Windows NT and Unix applications. (See "HP's P7 processor strategy critical to high-end NT," July 1, page 6.)

"We think it's a very important part of our strategy to start laying a foundation for Merced," Watts said.

▷ HP SERVERS page 16

Desktop Web servers

## Netscape's Win95 server ups the ante

By Jim Balderston

NETSCAPE COMMUNICATIONS CORP. this week will look to trump Microsoft Corp. with a version of its FastTrack Server that turns Windows 95 systems into Web servers.

This version of Netscape's low-end Web server offering, aimed at corporate departments, arrives on the heels of a heated dispute over Netscape's marketing of FastTrack for the Windows NT Workstation OS that broke out last week. (See related article, page 24.)

Netscape plans to bundle FastTrack for Win95 with the company's Navigator Gold browser, which includes Web authoring capabilities. The package, scheduled to ship by October, will be priced at \$295.

"They can use this as a way to publish information within a workgroup, or they can use it as a staging server," said David Penn, Netscape server product marketing manager.

Penn said FastTrack for Win95 has all the functionality found in

▷ FASTTRACK page 24

## PRODUCT COMPARISON You can get

good print quality for a song, but if your need is speed, it's gonna cost you



# The \$6,000 decision

Widespread corporate deployment of color printers has been "just around the corner" for years now. The eight printers in this comparison include four of the most popular color technologies — laser, ink-jet, solid-ink, and thermal wax transfer. Are any of them ready to take your office over the rainbow? The short answer: Keep your shoes on, Dorothy. When we began testing, we wonder-

▷ continued in RESULTS AT A GLANCE, page 73

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## Network protocols

## Novell readies ATM standard for NetWare

By Paul Krill

NOVELL INC. IS DEVELOPING A specification that will make it easier to build Asynchronous Transfer Mode (ATM) networking components for NetWare networks, from the server to the desktop level, the company said.

A draft of Novell's ATM-ODI (Open DataLink Interface) specification, which was presented last week, will be reviewed in October by the NetWare Connectivity Forum, a group of vendors that is also devising common interfaces for attaching routers, remote communications devices, and legacy systems to NetWare servers. ODI is Novell's specification for developing network card drivers for NetWare.

Products compliant with the ATM-ODI specification, which will continue to evolve, are expected to begin shipping in 1997.

Although ATM hardware already exists for NetWare, the specification is expected to make it easier to develop compatible devices by establishing standard interfaces, according to Martin Taylor, vice president of network architecture at forum

member Madge Networks Inc., an ATM hardware vendor based in San Jose, Calif.

"Generally, when people are installing adapter cards in servers, if there's a piece of software to provide LAN emulation, they'd rather have [the specification] come from the NOS [network OS] vendor than the network vendor, because it means the NOS vendors recognize ATM," Taylor said.

LAN emulation and support for ATM on the desktop for improved speed and performance will be a focal point of the connectivity forum, according to Frank Cabri, Novell's product line manager for interworking products, based in San Jose, Calif.

One analyst, however, questioned Novell's vendor-specific focus with the connectivity forum.

"I don't know what business [Novell] has in trying to get ATM out to the desktop," said analyst Neil MacDonald, of Gartner Group Inc., in Stamford, Conn. "Those problems are being solved by people like the ATM Forum," an industry-wide group studying ATM, he said.

But a NetWare user who expects to use ATM said he appreciated Novell's efforts.

"I think any of these forums where the vendors are working together to try to resolve these problems is great. It really helps us as end-users to deploy [ATM] in a much faster way," said Jerry Wacaster, a network specialist for Computer Language Research Inc., an accounting and software services company in Carrollton, Texas.

The NetWare Connectivity Forum is also developing a Mobile IPX specification that will enable router vendors and application writers to build equipment supporting campus roaming and wireless communications via Novell's IPX networking protocol. Also being worked on by the forum and due within a few months are specifications for configuring IBM terminals through Novell Directory Services; ISDN support; routing; WAN services; and IPX address extensions.

The forum was announced in March and, in addition to Novell, includes as members Bay Networks Inc., IBM, and US Robotics Inc.

## FROM THE NEWS DESK: MICHAEL VIZARD

## HP: easy-migration-so-you-can-sleep pill

So many vendors these days seem to be engaged in a schizophrenic marketing strategy designed to cover up the fact that their major cash cow product lines are about to be cannibalized by some new technology. That's why it's refreshing to

run into a company that appears to know how to manage change.

This week's Page One story by Deborah DeVore highlights what promises to be Hewlett-Packard Co.'s first tangible steps toward integrating its Unix and PC architectures. Early in 1997, it will be offering a set of server platforms capable of running either existing HP processors or the Merced chip that HP is developing in conjunction with Intel.

Granted, Merced probably won't arrive for another two years, but the

fact that you can invest close to half a million dollars in new servers today and have some sense that they won't be completely obsolete in two years is comforting.

In fact, this is what HP does well. It gives its customers a reasonably well-thought-out upgrade path so that they can sleep with some comfort at night. Companies such as IBM, Digital, Microsoft, and a few dozen others leave customers tossing and turning, wondering if their

chosen platforms are about to be abandoned.

HP, in contrast, does a good job of outlining exactly when your investments will become obsolete, so you can actually make a plan that means something. It's been about five years, but I remember the migration from HP's old CISC architecture to the PA-RISC architecture as being a relatively smooth affair.

This means customers who also remember that migration naturally have more confidence when HP starts talking about its Merced project with Intel. This is especially important because, contrary to what some folks in Redmond would have you believe, Windows NT is not going to replace Unix overnight.

NT may gradually find its way into glass-house applications by the turn of the century, but for now it's just a very nice application server platform. In the meantime, companies such as HP can offer the best of both worlds.

So is HP going to emerge as an industry leader, or will its strategy for change consign it to the dust heap of history like so many others?

Write me at michael\_vizard@infoworld.com.



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LEADING BROWSERS  
GET SEARCH ENGINES

Netscape Communications Corp. and Microsoft Corp. are moving search-engine capabilities directly into their Navigator and Internet Explorer browsers, respectively. Netscape released the 3.05 beta version of Navigator with a search engine and subsequently removed the functionality in the 3.06 version. Microsoft, meanwhile, has developed its own homegrown search engine (code-named Tripoli) for use in its server products. An AutoSearch feature will be included in the 3.0 release of Internet Explorer, which will be launched this week.

## PACBELL, CISCO TEAM UP ON BUNDLE

Pacific Bell and Cisco Systems Inc. announced last week they will jointly develop and sell computer communications packages tailored to small and medium-size businesses and telecommunications. Cisco will provide the remote access routers, and the phone company will oversee the connectivity. Pacific Bell's FastTrak ISDN will be used in initial bundles. Later solutions may include other fast-packet products, such as FastTrak Frame Relay service. Pacific Bell said 95 percent of California is now equipped to support ISDN.

## MICROSOFT TO EASE DATA WAREHOUSING

Microsoft officials last week announced the company is developing a series of technologies that will ease the creation of data-warehouse applications for Microsoft SQL Server databases, as well as online transaction processing applications. Microsoft is preparing data-aware ActiveX controls that make it easier to pull data out of relational databases and present the data in HTML. Microsoft is also working on a gateway between ODBC and IBM's DRDA (Distributed Relational Database Architecture) APIs that will enable SQL Server databases to receive data directly from DB2 or other mainframe databases for data mart applications. Microsoft will leverage technology from database gateway vendor NetWise Inc., which Microsoft acquired earlier this year.

## COROLLARY TO UNVEIL EIGHT-WAY CHIPS

Corollary Inc. will announce next week its next-generation bus-based server architecture that is designed to provide eight-way processing in Pentium Pro chips. (See "Vendors eye eight-way PCs," April 22, page 16.) The architecture will support clustering and nonuniform memory-access technology. The company will announce server OEMs for the technology at fall Comdex, and the first products based on the technology are expected in early 1997.

**BRIEFLY NOTED:** ► **LOTUS DEVELOPMENT CORP. AND APPLE COMPUTER INC.** announced Lotus Notes will run on Apple Network Servers. The support is provided via Notes Server for AIX and requires IBM's AIX 4.1 or later. Notes support will let Apple users develop and host collaborative applications on intranets and the Internet, the companies said. Domino, Lotus' new Web server technology, will let users develop and maintain interactive Web sites. ► **THE SANTA CRUZ OPERATION INC. AND HEWLETT-PACKARD CO.** will release 64-bit Unix API specifications to ISVs and OEMs by October. This represents the first step toward the next generation of Unix on the Intel platform. ► **IBM PC CO.** cut prices on one of its low-end ThinkPad 365 notebook models. The 365ED, featuring Cyrix Corp.'s 100-MHz 5x86 processor, 8MB of RAM, a 10.4-in. dual-screen, and a 540MB hard drive, was reduced in price from \$2,499 to \$1,999. ► **SAGENT TECHNOLOGY INC.** has released software to help users deploy data mart on Windows NT. Data Mart Solution for NT handles the extraction of data from a data warehouse, population of the data mart, and dissemination of decision support information to end-users.

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Add another dimension to your Web page



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# Tools for Success

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# Notebook surfers get Sharp double vision

■ Wide format displays two Web pages

By Carolyn A. April  
LEVERAGING ITS strength in LCD technology, Sharp Electronics Corp. on Sept. 17 will unveil a 4-pound notebook sporting a "wide-format" screen for viewing two Web pages side-by-side, sources close to the company said.

The notebook, which is not yet named, will ship in the fourth quarter, company officials confirmed.

Sharp's thin-film, wide-format transistor screen is actually an 11.3-inch active matrix display that has been minimally resized and sports a new aperture ratio. That gives the screen a slightly wider viewing angle than the 11.3-inch and 12.1-inch LCDs currently on the market. A higher XGA resolution (1024-by-680 pixels) also contributes to the expanded viewing area, LCD analysts said.

Sharp officials in Mahwah, N.J., said the notebook will come in two models geared toward corporate users who are heavily involved in work on the Web and the Internet. Industry observers seemed to

echo Sharp's marketing strategy.

"It appears to me they've taken what is an existing [LCD] standard panel and changed it for a specific application," said Michael Crawley, director of U.S. display marketing for South Korea's Samsung Electronics Inc., a Sharp rival.

The wide-format screen will also allow users to view full-size spreadsheets and avoid side-to-side scrolling to see entire documents. Sharp said power consumption on the new screen has been reined in to one-third less than standard LCDs.

The notebook will have either a 100MB or 133MB Pentium hard drive, and an integrated 28.8Kbps fax/modem, sources said. The floppy drive is external.

Other sources said Sharp has initiated an innovative redesign of the notebook's keyboard. Sharp would not comment.

Pricing has not been set yet, but industry analysts said it will be aggressive, starting as low as \$2,000.

## Sharp's wide-format notebook specifications

- 11.3-inch active matrix XGA screen (1,024 by 680 pixels)
- Screen dimensions: 9.6 inches wide by 5.6 inches high
- 133-MHz and 100-MHz Pentium processor
- 16MB of RAM
- 1.1GB hard drive
- Weight: 4.1 pounds
- Unit dimensions: 11.6 inches long, 7.75 inches deep, and 1.6 inches thick

## Multimedia framework for Internet/desktop

# Apple, Microsoft vie to set standard

By Tom Quinlan

APPLE COMPUTER INC. and Microsoft Corp. are in a race to develop a comprehensive multimedia framework for the Internet that would link multimedia standards with their own desktop multimedia APIs sets.

Apple intends to unify its various desktop multimedia technologies—including QuickTime, QuickTime Conferencing, QuickTime VR and QuickDraw 3D—and Internet standards into a single, unifying architecture. This will make it possible for ISVs to write a single multimedia application that can reside on the Internet or on the desktop and be compatible with Apple's different multimedia APIs and Web-oriented technologies, such as Virtual Reality Modeling Language (VRML), HTML, and Apple's 3-D Metafile format, Apple executives said.

"What we're doing is to integrate our multimedia API environment into a consistent architecture for our development partners," said Carlos Montalvo, director of the Internet group and acting vice president of Apple, in Cupertino, Calif.

To do that, Apple intends to create its own QuickTime Media Layer (QTML), designed to provide the same cross-platform standard for multimedia types as HTML did for

text-based data. QTML will provide an overall development environment that supports and integrates the QuickTime and QuickDraw technologies, Apple executives said. Microsoft is also moving in that

## Apple's multimedia, multiplatform strategy

- Use a common content/animation architecture for QuickDraw 3D, QuickTime VR, and QuickTime
- Use a standard way of implementing animation across all technologies
- Add the architecture to support consistent object containment model
- Develop AppleScript for Java programming environment
- Use HyperCard to add event-based programming to QuickTime 3.0

direction, said Kevin Dallas, Microsoft's DirectX marketing manager for the Internet platform and tools division, in Redmond, Wash.

Although DirectX 3D isn't shipping yet, Microsoft has developed an ActiveX component designed to give VRML-compliant Web-based applications access to its DirectX 3D API for better graphics performance on the desktop.

Additional ActiveX components or wrappers will be needed to link Web technologies to other DirectX APIs, Dallas said.

"We want our third-party developers to write the other wrappers," Dallas said.

Java will offer Apple the same type of glue technology between its different multimedia components as ActiveX will give Microsoft, said Gina Centoni, Apple's OpenDoc product line manager.

"Developers needed a fast, efficient way of accessing the different API architectures in a cross-platform environment, and Java is an excellent tool for that," Centoni said.

Apple's decision to go public with QTML coincides with its introduction of QuickDraw 1.5 for Windows 95 and Windows NT, an important component if Apple intends to become the Internet standard for multimedia data.

"If Apple delivers a rich set of functionality for Windows, then it's in a position to set an industrywide standard ahead of Microsoft," said Richard Doherty, founder of the market research company Environmental Inc., in Seaford, N.Y.

Apple is counting on its cross-platform capabilities to give it a leg up over Microsoft's similar efforts.

"This is incredibly important, because Apple has a chance to set a true standard," said Guernio De Luca, president of Apple's Claris software subsidiary, located in Santa Clara, Calif.

## VRML standards war may be at an end

By Judy Decker

AN IMPROVISED group of Virtual Reality Modeling Language (VRML) developers met last week at Siggraph in New Orleans to nail down some final details of the VRML 2.0 specification, which they hope will provide a standard for viewing and displaying 3-D content on the World Wide Web.

"The specification war is over," said Jim Jacob, CEO of Dimension X Inc., a San Francisco-based software company that recently licensed its browser technology to Microsoft Corp. (See "Microsoft Backs VRML," Aug. 5, page 1.)

In the coming months, the group will vote on extensions and enhancements to the VRML 2.0 specification. Apple Computer Corp., IBM, and Paraglyph International proposed last week a binary file format and compression technology to

ple to download and display VRML worlds 50 times faster than they can now," said Gregory Slayton, president of Paraglyph.

Black Sun Interactive Inc., Sony Corp., and Paraglyph are proposing a standard, called Living Worlds, for making avatars [3-D characters] common to all 3-D environments.

"Living Worlds will provide interoperability of avatars between everybody's systems," said Franz Buchenburger, president of Black Sun.

Also, Netscape Communications Corp. announced at Siggraph plans to integrate Kinetix Inc.'s 3-D products into its Navigator browser. Kinetix, a division of Autodesk Inc., is based in San Raphael, Calif.

Apple announced Version 1.5 of the QuickDraw 3D cross-platform set of APIs for rendering 3-D graphics on Windows 95, Windows NT, and MacOS. The product supports graphics files over the Internet; a vote will be taken in September. "Binary encoding will allow peo-

Macromedia Inc. announced a partnership with Intervista Software Inc. to create a VRML 2.0 converter for its Extreme 3D authoring tool. Users of Extreme 3D can now port their Extreme 3D files to a VRML format on the Web.

Extreme 3D runs on PC and Macintosh platforms and is available free to developers at <http://www.macromedia.com>. Information about Intervista is available at <http://www.intervista.com>.

Oz Interactive Inc. this week is beta testing its Oz Virtual multi-user VRML browser. The browser runs on a 14.4Kbps modem and Pentium PC, features customization of avatars, text-based chat, a sound engine with MPEG audio compression, and collision detection.

The company also announced Softvrm, which translates Soft-Image 3-D models into VRML files to create 3-D worlds on the Web. Both products are available at <http://www.oz-inc.com>. Oz Virtual will ship as a product later this fall.

## Web publishing tool

# PageMill 2.0 enters beta

By Chris Jones

ADOBE SYSTEMS INC. last week released the PageMill 2.0 Web publishing tool for public beta testing and also announced a list of third-party developers who will add powerful enhancements, including Java applets, search engines, drag-and-drop for database connectivity, and other dynamic page elements.

PageMill 2.0's Placeholder feature lets Webmasters place arbitrary code, such as JavaScript, Common Gateway Interface scripts, or Visual Basic script, into HTML pages, giving Webmasters a more customizable design environment. EveryWare Development Corp.'s Tango development tool, for example, can now be part of a PageMill-designed Web page. Tango connects Web pages with major databases.

PageMill 2.0 adds other features, including support for HTML tables

and frames and viewing and editing of HTML source code.

The new features, particularly the capability to add to and edit HTML source code, makes PageMill more useful to serious Web page designers. Analysts said that if PageMill does everything Adobe says, it will raise the bar for HTML design and editing programs.

"A lot of people have bits and pieces similar to these tools, but it's usually voodoo," said Harry Fenick, an analyst with Zona Research Inc., in Redwood City, Calif. "The question is: How bullet-proof is this?"

PageMill 2.0 will be available in September for Macintosh and in October for Windows NT and Windows 95. A free pre-release beta version of the program is available at <http://www.adobe.com>, a Windows beta will be available in mid-September.

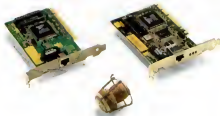
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## Raft of TCP/IP application suites on the way

By Yvonne L. Lee

VENDORS will be sporting improvements that make their TCP/IP application suites more suited to enterprise environments at TCP/IP Expo in San Jose, Calif., this week.

Most companies are not planning major revisions, because many introduced new Windows NT versions last month. But the enhancements make the products easier to manage and more efficient to run in multipatform environments.

For example, InterCom Systems Inc. will introduce a helper application that enables IS managers to keep track of the licensing of its tcp-Connect4 Mac and Windows package. The Herndon, Va., company's fluid licensing program allows corporations to mix and match the OS

versions purchased in a site license. It also permits organizations to switch to another from one platform to another without having to purchase a new license. The new application, called Keyring, works with fluid licensing to keep track of the number of tcp-Connect4 packages installed, as well as what platform they are on. Keyring can also tell network managers the configuration of the packages, and it can report the specific combination of tcp-Connect4 applications that have been loaded.

Keyring will ship later this month in versions of tcp-Connect4. Registered customers who have purchased the software will receive the

update for free.

Walker Richer and Quinn Inc. (WRQ) has sharpened the TCP/IP connection stack included with its Reflection suite. Most vendors have

► NetManage Inc. will also preview its Chameleon suite, due to ship next month at TCP/IP Expo.

abandoned development of TCP/IP stack software and focused instead on building application suites that work with the TCP/IP stack included in Windows 95.

But WRQ is touting features that it says are not included in Windows 95, such as optimization for line noise in remote communications; support for 100Mbps Ethernet; software for managing servers; and support for BOOTP and RARP, IP addressing protocols that are not supported in Windows 95.

## Single IP gateway to regulate access

FTP SOFTWARE INC. this week will unveil Internet gateway for Windows NT and NetWare featuring firewalls that can regulate data access.

The Internet gateway for Windows NT and the Internet gateway for NetWare both provide LANs with a single, server-based IP address. This means network managers don't have to deploy IP on each desktop, said Tom Casey, prod-

uct manager for server products at FTP, in Andover, Mass.

The NT product can also act as a gateway for desktop clients on NetWare networks, Casey said.

FTP's offerings, slated to ship in December, will offer a firewall capability enabling, for example, an administrator to limit user's Internet access. Web browser usage times also can be restricted.

The applications will feature re-

porting tools to keep track of usage, Casey said.

Pricing has not yet been set.

The NetWare gateway can be coupled with FTP's upcoming Web server for NetWare, called Internet Document Server for NetWare, to enable centralized management of the two products.

Quarterdeck Corp., in Marina del Rey, Calif., also offers an IPX/IP gateway, for Internet access to NetWare, called I-Ware Connect. It has a list price of \$90 per concurrent user for 100 users.

— Paul Krill

## IBM moves to Java for OS/2 development

By Tom Quinlan

JAVA'S STERNEST test as a miracle tool may be coming up: IBM is counting on Sun Microsystems Inc.'s development environment to create a new body of software for OS/2 Warp.

With the latest version of the 32-bit OS/2 Warp OS just weeks away from shipping, IBM is giving software developers a clear directive to start using Java as the development environment for OS/2.

IBM is willing to reconfigure its OS in almost any way necessary to make it a better Java platform, including adding support for non-IBM object request brokers (ORBs) if necessary, said IBM's John M. Thompson, senior vice president and group executive at IBM, in Somers, N.Y.

"If Java were to incorporate some other ORB than SOM [Systems Object Model], and it's an industry standard, we will support it. If there is some other architecture [besides IBM's SOM] that our customers

want, and it is an industry standard, we'll support it," Thompson said.

That could even include more support for Microsoft Corp.'s ActiveX technology through IBM's use of Java Beans, although Thompson made it clear that "we don't intend to build support for ActiveX in OS/2 directly."

### STAROFFICE GOES TO BETA

Star Division Corp. has announced that the StarOffice 3.1 desktop applications suite for IBM's OS/2 platform is now in beta testing and will be available later this year.

The StarOffice suite, which is also being developed for Windows, Macintosh, and Unix platforms, includes a word processor, spreadsheet, graphics, and presentation package. Touted as a Web-ready suite, all the applications will import and export to HTML, and there is built-in support for HTML 3.0 and Netscape Plug-ins.

The beta version of StarOffice 3.1 for OS/2 can be downloaded at <http://hobbes.nmsu.edu/~demo>.

— Chris Jones

IBM's interest in Java isn't new. The company announced early this year that it would heavily support Sun's environment.

But Thompson's comments on the eve of the latest iteration of OS/2 — code-named Merlin — were the strongest indicators yet that IBM will use OS/2's fortunes to the Java environment.

"There are still some applications where it would make sense to develop directly for OS/2," Thompson said.

However, the industry's overwhelming interest in Java makes it the broader-based development environment, Thompson added.

In addition, Thompson last week expressed interest in courting Netscape Communications Corp. to develop an OS/2 version of its Navigator browser.

## Intel delays debut of MMX Pentium chip

### ■ Klamath release pushed forward

By Luc Hatlestad

INTEL CORP.'s acknowledgment last week that it will delay the rollout of the P55C, its Pentium processor with built-in multimedia extension (MMX), was seen by industry observers as a way for the company to simplify users' purchasing decisions as they decide whether and when to migrate from Pentium- to Pentium Pro-based PCs.

The company said it will delay the release of the P55C from the fourth quarter of this year until early 1997.

At the same time, Intel officials indicated that the MMX-enabled Pentium Pro processor, code-named Klamath, may be unveiled closer to or at the same time as the P55C. Klamath was originally slated for a second-quarter release.

The proximity of the expected announcements underlines Intel's overall strategy of positioning the P55C for the home market and the Pentium Pro as a corporate solution, according to analysts.

"The positioning of the announcements will make people choose between Klamath and the P55C," said Dean McCarron, a principal at Mercury Research Inc., in Scottsdale, Ariz. Intel's theory is that home users will want the P55C to run games and multimedia applications over the Internet. The company is steering corporate users to-

ward the 32-bit environment of Klamath, even though at this point there are few business applications that require MMX, he pointed out.

Corporate buyers appeared to agree the P55C cannot stand alone as a technology with a broad, compelling appeal.

"We just bought a bunch of 486s because they're so cheap and powerful," said Don Miller, director of IS for Wolfpop & Abramson LLP, a legal firm in Bethesda, Md. "Unless you're in a specialized field that uses a lot of graphics and multimedia, you don't need the horsepower of the [MMX-enabled] Pentium Pro at the desktop."

Additional possible reasons for the delay are a scarcity of programs that can use the MMX technology and a possible backlash by system OEMs who want to clear out their current sales channels by year's end.

"Moving back the P55C is a great decision. The fourth quarter is a bad time to launch because OEMs are too busy with their Christmas lines," said Nathan Brookwood, principal analyst for microprocessors at Dataquest Inc., in San Jose, Calif.

Intel officials said the delay gives them more time to meet the demand of OEMs' "spring refresh" and MMX application developers time to bring their products to market.

### For the record

An Aug. 5 Server section Pipeline item (page 35) incorrectly stated the price of Platinum Technology Inc.'s Watch PI database product. Pricing starts at \$1,295.

In the Internet firewalls Product Comparison (see July 29, page 1), we neglected to add the cost of server hardware to the price of CheckPoint Software Technologies Inc.'s CheckPoint Firewall-1 2.0, a software-only product. CheckPoint costs \$18,900. We ran it on a Sun Sparcstation 4-110, which costs \$4,200, for a total cost of \$23,100. We should also have noted that, for the price of \$15,000 we reported, Trusted Information System Inc.'s Gauntlet Internet Firewall 3.1 includes an Intel-based PC with 16MB of RAM. These changes do not affect the price scores or the final scores.

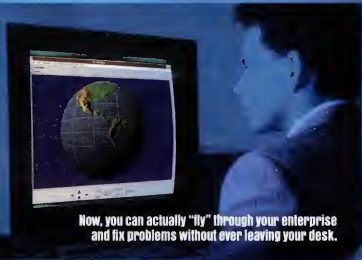
We stated that CheckPoint is vulnerable to attack for a few seconds during the system boot. CheckPoint told us that if IP forwarding is disabled, this is not a problem. CheckPoint chose not to do this automatically because it believes Unix administrators prefer to do it manually. We believe flexibility is secondary to security; furthermore, this behavior is not documented in the installation section of the manual. Therefore, CheckPoint's security score remains satisfactory.

Finally, we failed to mention that Harris Computer Systems Corp.'s CyberGuard Firewall 2.1.2 is the only product with a BI security rating from the National Computer Security Center.

The July 29 article "Olympus offers an industry surprise with its low-cost portable MO drive" (page 32) should have listed the seek time for Olympus Image Systems Inc.'s SYS.230 at less than 17 milliseconds. Also, Olympus' URL is <http://www.olympusamerica.com>.



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## Internet computers

# Cyrix plans integrated chip for low-cost Internet access

By Luc Hatlestad

CYRIX CORP. acknowledged last week that it is designing a CPU that integrates a 5x86 logic core, PCI and memory controllers, a graphics accelerator, and 16-bit audio onto a single piece of silicon to enable OEMs to deliver a fully functional computer for less than \$1,000, according to a Cyrix representative.

Cyrix will unveil its new chip, code-named Gx86, early in the fourth quarter, but analysts are already singing its praises.

"This is absolutely the right way to do Internet connectivity," said Martin Reynolds, senior analyst at Dataquest Inc., in San Jose, Calif. "The integrated controllers will make it very efficient and keep costs potentially very low."

The announcement will position Cyrix squarely between Oracle Corp.'s Network Computer (NC) specification and Intel Corp.'s Connected PC.

Oracle announced the NC earlier this summer as a stripped-down box that would provide users Internet access for about \$500 per unit.

Intel countered last month with its plan for the Connected PC, a higher-end desktop box that will alleviate potential Internet bandwidth problems by putting all the processing power on the computer. (See "Intel outlines Connected PC initiative," July 29, page 8.)

Cyrix's integrated chip design will allow companies to deliver a network PC that will fall between the Oracle and Intel offerings in

terms of cost and performance, analysts said.

"Intel isn't interested in playing below \$1,500," said Dean McCarron, a principal at Mercury Research Inc., in Scottsdale, Ariz.

"Cyrix can exploit the fact that the Gx86 is more closely aligned with the x86 than with the Pentium and deliver this computer for between \$800 and \$1,200," McCarron added.

The finished product will be a nonupgradable box that includes such features as a detachable keyboard with infrared connectivity, Cyrix officials said.

Although company officials would not comment on the expected clock speed of the Gx86, McCarron said it should arrive at about 133 MHz and provide users with plenty of power to run Internet applications.

"DX4-class performance is all anyone will need on the Internet for the next year or so," McCarron said.

"You may not be able to run MMX applications, but you can run other multimedia programs."

Among the companies Cyrix is working with to develop the platform for building PCs is Microsoft Corp., according to Cyrix officials.

"Microsoft will want to make sure the software is available to enable multimedia applications to run on that architecture," Reynolds said.

An ISA bridge chip, a digital-to-analog video converter, super I/O, and a modem will all reside outside the chip.

# NT steps up to high-end graphics

■ Vendors announce NT workstations and graphics cards

By Judy DeMocker

WINDOWS NT made inroads into the high-end graphics market last week at Siggraph, in New Orleans, with announcements of high-end workstations and graphics cards from Digital Equipment Corp., Intergraph Corp., and DeskStation Technology Inc.

Digital led off the NT charge with three graphics accelerator cards and a 500-MHz AlphaStation running Windows NT. The company announced an entry-level AlphaStation 500/500 running NT with a 500-MHz Alpha processor, the new 4D60T graphics adapter, 2MB of cache, 128MB of memory, a 2GB hard disk, and a 21-inch

monitor for \$54,600. The AlphaStation 500/500 will ship in September.

Also in Digital's hardware repertoire to boost NT perfor-

mance on the Alpha are its 4D40T, 4D50T, and 4D60T PowerStorm graphics accelerator cards, priced at \$33,995, \$77,995, and \$111,995, respectively.

The adapters let users generate high-speed signals modeling 3-D and virtual worlds, and texture mapping.

Intergraph is also positioning itself as the company to optimize 3-D graphics on

the NT platform with its announcement of the Studio2, a



INTERGRAPH'S TDZ workstation builds real-time 3-D graphics.

► For more Windows NT workstation coverage, see page 29.

workstation. Systems scale from one to four 200-MHz Pentium Pro processors with 256KB of cache, an eight-speed CD-ROM drive, an Ultra SCSI hard disk subsystem, and a 10/10Base-T Ethernet interface. The Studio2 starts at \$25,195 for a single-processor system. It will ship this month. Intergraph also announced that it will drop the price of its entry-level TDZ workstation to \$7,995.

DeskStation announced its Rapitor Renegade NT workstation running one or two 500-MHz Alpha 21164 processors. The Renegade sports a 1GB memory bus and a 128KB 66-MHz data path, eight PCI slots, an Ultra Wide SCSI-2 hard disk interface, and 16-bit audio. Single-processor systems cost \$118,000 and dual-processor systems cost \$25,000; both will be available in volume in October.

# Novell to plug Web server with NetWare 4.11

By Asa Krill

AS EXPECTED, NOVELL INC. will bundle a Web server in the next release of NetWare, which began beta testing last week and will ship this fall.

But Novell has put off NetWare Distributed Print Services (NDPS), offering bidirectional communications between NetWare and printers, until the first half of 1997. It had been slated for this fall's NetWare release, designated as Version 4.11, also called the Green River release.

Novell's decision to bundle the

NetWare Web Server 2.5 follows Microsoft's bundling of its own Internet Information Server with Windows NT. Although Novell hopes its large installed LAN presence will give it a leg up in the Web market, many users have doubted the viability of NetWare as a Web server platform.

One NetWare user said that his company would not deploy Web services on NetWare because NT and Unix are better suited for this.

"It's just that I don't think NetWare is a suitable platform to run

[Web] applications on," said Fergus Hammond, systems administrator for the engineering group at ISV Adobe Systems Inc., in Seattle.

Novell, however, maintains that users will want to deploy Web services in existing NetWare networks.

The delay in NDPS is due to development taking longer than expected, said William Donahoe, senior director of product marketing for Novell, in Orem, Utah.

NetWare Version 4.11 features integrated TCP/IP support and licensing services.

# Microsoft raises price of NT Server 4.0

By Paul Krill

MICROSOFT CORP.'S \$100-per-server price increase for Windows NT Server 4.0 won't win any popularity contests, but the increase is unlikely to dissuade customers from choosing NT, users said.

"It's never too smart to [raise prices]," said NT user Jeff Furst, a communications analyst at EDS Personal Communications, a Waltham, Mass.-based outsourcing company. But Furst noted the increase may not affect EDS.

"I can't tell you how much it's going to affect us because being such a large corporation, we tend to get [discounts] anyway," Furst said.

NT Server 4.0 will ship later this

month. A 10-client version will carry an estimated street price of \$1,129. This same configuration for NT Server 3.51, the current version, costs \$999.

Price increases in different configurations average about \$100, according to Microsoft. Upgrading a 10-user server from a previous version of NT, however, costs \$539.

Microsoft said the new functionality in NT 4.0 justifies the increase. NT 4.0 offers new features such as a bundled Web server, multiprotocol routing, and protocol analysis.

One analyst panned the increase. "I think it's a bad move," said analyst David Strom, a contributing editor for InfoWorld and owner of

David Strom Inc., in Port Washington, N.Y.

Another user said the increase was not enough to scare off users.

"I don't think it would make anybody change back to Novell," said Don Stevenson, an IS official at Batterymarch Financial Management Inc., in Boston.

However, a Novell Inc. official charged that Microsoft was locking customers into the NT platform, then raising prices.

NetWare 4.1, by comparison, costs \$2,495 for a server with 10 users; however, NetWare has an enterprise directory, which NT lacks. IBM OS/2 Warp Server costs \$829 for a 10-user version.

# DATAQUEST REVISES OS FIGURES

Dataquest Inc. revised estimates for worldwide PC operating system shipments, slashing prior predictions for 1995 and 1996 Windows end-user shipments approximately in half and 1996 Windows 95 shipments by 27 percent.

Dataquest attributed the changes to a higher-than-expected demand for Windows 3.1x as companies deferred moves to a 32-bit environment. Dataquest defines OS shipments as units actually put into use by an end-user rather than the total of vendor shipments from the factory, resulting in differences from vendor estimates.

Dataquest now estimates that 961,000 units of NT Workstation and 318,000 units of NT Server shipped in

1995, with 1996 shipments estimated at 3.45 million and 550,000, respectively. Unit estimates for Windows 95 are 18.53 million shipped in 1995 and 45.73 million that will ship in 1996.

Microsoft Corp. said it shipped about 1 million units of NT Workstation and 450,000 units of NT Server during the fiscal year ending June 1996 and 40 million copies of Windows 95 after one year (through this month).

OS/2 projections changed slightly, with 1995 shipments estimated at 1.75 million and 1996 shipments at 1.7 million. Dataquest said IBM said it sold through all channels more than 5 million copies of OS/2 Warp in 1995 and 1.4 million copies in 1996 through June.

—Deborah DeLoe





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## SPECIAL NEWSREPORT

## HP prepares for shift to Merced

By Deborah DeVoe

AS HEWLETT-PACKARD CO. looks to become a more dominant force in the PC systems space, it faces the daunting challenge of marrying its Unix systems heritage with emerging PC technologies.

The key technological underpinning for meeting this challenge is Merced, a joint effort between HP and Intel Corp. to develop a 64-bit processor that is quickly becoming the driving force behind HP's product plans. (See article, page L.)

But before that architecture is put into place, HP needs to unite the PC and Unix cultures that have grown up separately within the Palo Alto, Calif., company.

One key move made last year was having both its Computer Systems Organization (CSO) and its Network Server Division (NSD) report to Rick Belluzzo, executive vice president and general manager of HP's Computer Organization.

"The goal is to take the strengths of what we've learned in systems client/server computing — Unix and RISC — and what we know in PCs and be able to bring those together to create a synergistic combination," Belluzzo said. "We don't see it as one vs. the other."

The Merced project holds great promise, but some users think HP may not be moving quickly enough. "Digital [Equipment Corp. has]

had a 64-bit chip and OS for well over a year now and Sun [Microsystems Inc.] is just now breaking in. But IBM and HP are still off into the nebulous future. I would expect [that a company] with as much power in the field as HP would have

made it a singular priority," said Doug Apel, a network administrator at Fort Worth, Texas-based Omniscient Corp.

HP, however, isn't in total control of its timetables after having teamed with Intel on the hardware side and joined with The Santa Cruz Operation, Inc. and 20 other partners to create a common 64-bit Unix.

"By the end of 1997, we will have a common [3DA Unix] platform for more than 30,000 applications. Each company will have its own brand-name compatibility," said Rick Sevcik, vice president and general manager of CSO's Systems Technology Group.

HP's Unix with 3DA Inside will run on Merced. Then we can take all existing Intel applications and run them on Merced, too," HP has also announced that it is collaborating with Novell Inc. to develop directory services and security services for NetWare and HP-UX and is interested in similar plans for Windows NT with Microsoft Corp. For example, HP would like to include improved OpenView interoperability and common application development with NT, providing developers with common look and feel for development that requires just a push of a button to compile the application for NT or HP-UX, said Dick Watts, CSO's vice president and general manager.

But for some analysts, this integration work just highlights HP's vulnerabilities. "All that clashing between the Net-Server line and the low-end [HP 9000]

K series is [expected] to go away as everything is put on Merced," said George Weiss, an analyst at Gartner Group Inc., in Stamford, Conn. "But there's also the question of how HP will execute the migration."

Problematic issues range from the compatibility of I/O boards to convincing customers that the change is a positive one, Weiss said. HP competitors, of course, will present the

HP migration in a negative light.

HP, however, counters that any migration issues raised by Merced will bring more benefit to its own PC division than to its rivals.

"Our commercial-server business has just been booming and our NetServer growth has been phenomenal," Sevcik said. "It's a win-win scenario."

But with NSD's formation last week of the Enterprise NetServer Operation, the current line between the two divisions is blurring rapidly and HP will likely have to face the same problems that have plagued midrange systems vendors such as Digital and IBM.

One key difference, however, is that the advent of the Internet and the World Wide Web may now minimize the differences between platforms in a less-compelling issue.

But thus far, HP's Internet efforts have been less than stellar.

HP last week appointed Ira Goldstein as the company's Internet technology officer and chief technology officer for CSO, and the company plans in September to make announcements that articulate its comprehensive Internet strategy, Watts said.

The question is whether it will be too little, too late for HP's customers. "HP is still playing catch-up, and I think their Internet strategy is still evolving," said Gene Lee, an analyst at International Data Corp., in Mountain View, Calif. "HP tends to think very long term strategically, whereas Sun thinks very short-term tactically. In the long run, HP's style has more staying power."

## HP servers

Continued from page 1

"You will see a lot more steps before Merced is here," Watts added.

Sources said K-Class upgrades will consist of four models, including a four-processor configuration. Meanwhile, the base PA-8000 T-Class offering will be the T600, capable of supporting 12 processors, 16GB of main memory, and 30 terabytes of storage, the sources added. The T600 will also tout considerable performance increases due to I/O and CPU-to-memory bus improvements, sources said.

The PA-8000 T-Class server is due to ship by early 1997, HP said, but company officials would not say if the T-class servers will support a Merced upgrade.

"The PA-8000 will significantly enhance HP's price and performance, probably putting them back up in the range from a pure performance standpoint against Sun and Digital and certainly keeping them above IBM," said Morgan Gerhart, an analyst at Meta Group Inc., in Burlington, Calif.

HP, however, may have a tough time convincing customers that a migration to a new architecture is in their best interests, analysts said.

"HP would be wise to never mention that [its existing] architecture will be superseded in the next [few] years. Competitors are hammering to users that HP will be changing its OS and chip architecture," said Scott Winkler, an analyst at Gartner Group Inc., in Stamford, Conn. "The movement to 64-bit technology will cause upgrade problems and stability issues. Users will be wise to wait before upgrading, but after a while they will be forced to upgrade to [get] the new technology," Winkler added.

## PENTIUM PRO SERVERS

**N**ot to be left in the dust by RISC systems, Hewlett-Packard Co.'s Network Server Division will announce on Aug. 26 200-MHz Pentium Pro servers.

Scheduled to ship in early September, the new Pro Servers will be available in single, dual, and quad-processor models, based on the chip and with 512KB of Level 2 cache, HP added. Sources said that pricing will start at about \$13,800 for a single-processor model with 64MB of RAM.

\* See Hot Seat interview with Duncan Campbell of HP's Network Server Division, page 39.

## Pentium Pro chips

## NCR servers get 200 MHz

By Judy DeMolter

and Parduha Vadmaladi

NCR CORP. last week upgraded its WorldMark line of multiprocessor servers with 200-MHz Pentium Pro chips, offering power-hungry users scalability of as many as 128 nodes for transaction processing and data warehousing applications.

The WorldMark servers sporting the 200-MHz Pentium Pro processors include the 4100 with support for as many as eight CPUs; the 4500 with as many as 16 processors; and the 5100S with as many as 32 processors. The systems boast 512KB of Level 2 cache.

To scale past 16-way, NCR said it will cluster boxes using its 64Gbps Bynet interconnect and a uniform memory access architecture.

"This is a major enhancement to a very good product line," said Gene Lee, research manager for midrange servers at International Data Corp.,

in Mountain View, Calif. "Other vendors may have announced four-way support before NCR, but I'm not aware of anyone shipping the Pentium Pro. The forecasts are theoreti- cal, but they've set an October delivery date."

Lee said NCR had improved the scalability of the Windows NT OS; the company will announce 16-way scalability on that platform.

Each system comes in a standard symmetric multiprocessing S model or a C-clustering model with full failover capability. New systems will ship in October.

The WorldMark 4100 with a six-way board, 256MB of RAM, 12GB of disk storage, and seven I/O ports is priced at \$115,000. At the high end, the 5100 with 16 processors, 1GB of RAM, 12GB of disk storage, and 16 I/O ports costs \$620,000. I/O ports are each four-way Fast and Wide SCSI or Ethernet.

## InfoSpace ships Java-based data-access, analysis tools

By Ted Smalley Bowen

START-UP InfoSpace Inc. this week will ship a Web browser-based database query and analysis tool that uses Java to tap into SQL databases and to display graphics.

At DCI's data warehousing show in New York, InfoSpace will unveil WebSequel query, reporting, and charting application. The product includes InfoSpace's WebChart 3-D graphics applet and a Web-server-based component that handles database access and scheduling.

The applet's graphical query interface automatically generates SQL statements, and the query designer also has a SQL editor. WebSequel's report generator supports HTML, Java charts, Java tables, GIF, Virtual Reality Modeling Language, and comma-separated formats.

The data-access application, which is initially priced at \$195 per

client (final pricing has not been set), supports the ODBC standard and a native access to Oracle 7, with interfaces for Sybase, Informix, and DB2 databases slated for next month and the Java Database Connectivity standard for later this year.

Next month InfoSpace will unveil Web Warehouse, which will offer users data mining features with a Java-enabled browser.

"With an Oracle server configured as a central server, we can use WebSequel for predefined and ad hoc reports. With Web Warehouse, we can provide access to our clinical outcome studies for internal business use and customer access," said Eugene Wang, a consultant with Healthpoint Inc., in Hayward, Calif. "We wanted to provide these capabilities for our clients and we haven't seen any other products that go beyond HTML support."

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Note: Data for comparison obtained from company literature, accurate as of 7/15/98



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Has It Changed Your Life Yet?

# Microsoft's ActiveX delays raise questions

By Cara Cunningham

MICROSOFT CORP. has postponed a meeting to discuss moving ActiveX to an independent standards organization, prompting competitors and industry observers to question the software giant's true intentions.

Citing problems with organizing a large

meeting at such short notice, Microsoft officials said they will delay the ActiveX meeting — first slated for August — until at least September.

At the meeting, Microsoft will decide how to transfer its ActiveX component specification to an independent organization run by

users and ISVs who employ ActiveX, said Cornelius Willis, group product manager with Microsoft's Internet developer marketing group.

"People who are making a living on ActiveX will decide what to do with it," Willis said.

One executive with Netscape Communica-

tions Corp. last week said that Microsoft's move is just a public relations effort.

"Microsoft has no plan to place ActiveX and DCOM [Distributed Component Object Model] in front of a standards body," said Mike Homer, Netscape's senior vice president of marketing.

"Microsoft is going to be their own biggest violator of the rules of the ActiveX consortium," echoed Stan Dolberg, an analyst with Forrester Research Inc. in Cambridge, Mass. "They're not going to sit around and play patty-cake with the industry."

Some standards groups that compete with ActiveX, such as the Object Management Group and Component Integration Laboratories, said they were surprised that their requests to participate in the ActiveX standardization meeting were met with a polite "no thanks" from Microsoft.

"The first meeting is for stakeholders in the technology — customers and ISVs — and we will leave it up to them to decide what affiliations to other standards bodies [will be made]," said Tom Button, director of marketing for Microsoft's Internet platform and tools division.

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## REPLYNET ANNOUNCES WEB POINTER SERVICE

REPLYNET INC. last week announced The Pointer Network, a service that lets users access World Wide Web addresses by entering a keyword or phrase instead of typing the entire HTTP address.

The Pointer Network is essentially a browser redirection service that allows for instantaneous redirection to a Web site when a "pointer" word or phrase is entered into The Pointer Network site at <http://www.pointer.net>. ReplyNet is working with other major Web sites to provide pointer access directly from their sites.

The service costs \$60 per year to sign up for the first pointer, plus \$25 for each additional pointer.

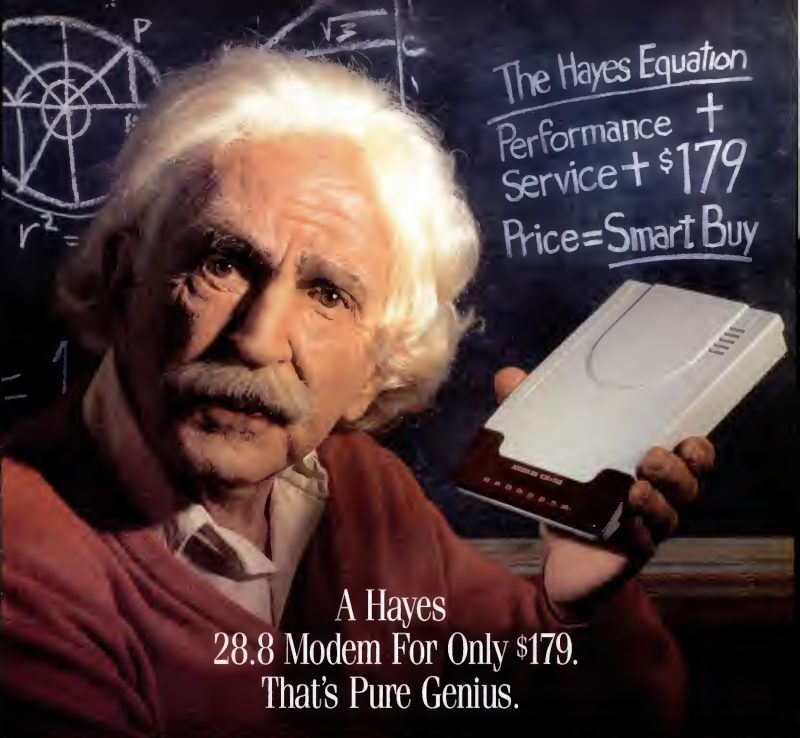
ReplyNet is targeting the service at corporate customers who want to do everything possible to attract Web surfers to their sites.

The company will also offer statistics reporting services to users who sign up for pointers that will calculate the number of hits a pointer receives and report which kind of browser a Web surfer is using to access the site. The Pointer Network also allows an e-mail message to be sent to the owner of the pointer without the sender needing to know the actual e-mail address.

Some analysts are skeptical that such a service is necessary in the age of sophisticated browsers that offer bookmarking and shortcuts to favorite Web sites.

"The value of this service, which you have to pay for [on an ongoing basis], doesn't impress me," said Mark Levitt, an analyst for International Data Corp., in Framingham, Mass. Many browsers already let users skip typing in the "http://www" part of a URL. Levitt added.

—Kristi Essick, IDG News Service, San Francisco



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# Netscape, Microsoft fight over NT

## ■ FastTrack marketing challenges NT Server and IIS prices

By Paul Krill

**MARKETING COMMUNICATIONS** Corp. and Microsoft Corp. locked horns last week over the use of Microsoft's most valuable franchise — the Windows operating system.

The two companies' attorneys exchanged angry letters after Microsoft's counsel demanded Netscape cease marketing its FastTrack Server, which runs on Windows NT Workstation — as a less expensive alternative to Windows NT Server with the Internet Information Service (IIS). (See article, page 1.)

Microsoft moved quickly to dispel notions that NT Workstation could

function as a Web server platform.

"The price comparison is unfair and deceptive, because the cost on the Netscape side of the ledger erroneously assumes the user can run the Netscape Web server software on Windows NT Workstation and make unlimited connections to a Web site," said the July 30 letter from Robert Gomuliewicz, Microsoft's senior corporate attorney, to Robert Katz, Netscape's general counsel. "That is not the case."

According to Microsoft, Netscape has posted on its home page a comparison showing its \$295 FastTrack Server running on the \$319 NT

Workstation product, saying the combination is more affordable than Microsoft's bundling of IIS with Windows NT Server for \$699.

Such a comparison implies a violation of the 10-user licensing limit that Microsoft attaches to its NT client, Microsoft said.

After much criticism for including code in the beta version of its new NT Workstation 4.0 release that would limit the connections to 10, Microsoft publicly announced July 19 it would not employ that technical limitation. The licensing restriction remains, but Microsoft said it would not enforce it.

"I'm surprised that Microsoft sort of initiated this with its letter to Netscape," said Dwight Davis, editorial director of *Windows Watcher* newsletter, in Redmond, Wash. "It probably would have been smarter for Microsoft to lay low instead of tripping what we see is an industry-wide debate that will draw the attention of the Justice Department."

FastTrack Server works well for less money than comparable Microsoft products, said Mike Homer, senior vice president of marketing for Netscape.

"We are going to keep telling people that these products work well together," Homer said.

For the full text of Microsoft and Netscape's letters, see InfoWorld Electric at <http://www.infoworld.com/cgi-bin/displayStory.pl?96087.legalnet.htm>.

# FastTrack

Continued from page 1

other flavors of FastTrack, such as the Unix or NT versions.

"We did not throttle this back in any way," Penn said. He added that the Win95 FastTrack server can handle "17,000 to 20,000 CGI [Common Gateway Interface] and HTML requests in a 2-hour period."

Industry observers said Netscape was using the low-end server to expand its territory on the desktop.

"Their idea is to make the Web server as ubiquitous an office application as Word, Excel, PowerPoint, and the like," said Ira Machefsky, an analyst at Cisa Information Group, in Santa Clara, Calif.

"This lets Netscape turn the tables on Microsoft in the client/server market. They are turning a \$50 desktop into [the equivalent of] a \$900 server, so from Microsoft's point of view, it's losing \$850 per desktop," Machefsky said.

Microsoft will not be able to attempt to limit IP connections through the Win95 version of FastTrack, the way it has limited IP connections to NT Workstation, said Phil Johnson, an analyst at International Data Corp., in Framingham, Mass.

"I spoke with Microsoft [representatives] this week, and they said no such limitation is in the license," Johnson said.

Johnson also said the placement of Web servers on desktops could make it easier to deploy groupware applications.

"In terms of collaborative computing, it makes a great deal of sense," Johnson said.

Microsoft is free to release its own lightweight Web server tools in Version 4.0 of Internet Explorer (IE), which the company plans to release by year's end. (See "Microsoft releases Web wave," April 22, page 1.)

"Microsoft is going to be giving away a very lightweight server in IE 4.0," Johnson said. "For that reason, if I were in charge at Netscape, I would have priced FastTrack for Windows 95 at half of the proposed price."

FastTrack will also play a role on desktops in the Netscape Open Network Environment distributed object computing framework.

"FastTrack will definitely support the ITC [Internet Inter-ORB Protocol framework classes]," Machefsky said.

Machefsky said Netscape expected companies to use lightweight Web servers as an alternative to other ways to desktop functionality.

"Netscape is betting on people spending money on a Web server instead of an operating systems upgrade," Machefsky said.

## Online services

# AOL leaves users in the dark for 19 hours

By Jeff Walsh and Jessica Davis

**AMERICA ONLINE INC.**, the largest and fastest-growing online service provider, experienced a 19-hour "service interruption" last Wednesday, leaving its 6.2 million users without Internet access or e-mail.

The trouble began during scheduled maintenance, from 4 a.m. to 6 a.m. Eastern time, to install new high-capacity switches within the LAN in the company's data centers, according to Steve Case, chairman and chief executive officer of the Vienna, Va.-based company.

While the system was down, AOL's network access provider, ANS Corp. Systems Inc., erroneously reconfigured routing information. Because the system was down, no diagnostics could be run to figure out what the problem was.

Later in the day on Wednesday, AOL's router vendor helped install new code to fix a newly discovered glitch in its router operating system software. At about the same time, ANS recognized its configuration error and corrected it.

Similar networking problems took

place two months ago at Netcom Online Communications Services Inc., causing a service outage blamed on an incorrect configuration of Cisco Systems Inc. routers. The outage lasted for about 12 hours.

A Cisco representative said that AOL is a major Cisco customer and that Cisco technicians were on-site at AOL on Wednesday during the outage but would not confirm that Cisco routers played any role in the service outage.

Case pledged in a letter to subscribers that AOL will compensate

users for the lost service by prorating the monthly fee, crediting them for the equivalent of one day.

But that one day of reimbursement does not cover the lost business and productivity at companies that rely on AOL as a provider of e-mail and Internet access services. "I've got two words for it — bitter frustration," said Chris Salg, a user at a training organization for wireless data topics. His office has nine users that rely on AOL, mostly for e-mail to communicate with clients.

Salg's office has been using the service for more than a year, he said.

"We chose AOL because it had the name and the reputation," Salg said. "Now we are slowly regretting that. We might consider other services in the near future."

# Apple

Continued from page 1

users view several layers of data at a time, rather than screen by screen.

Apple demonstrated the technology by surfing the Web, but users familiar with Apple's plans said the company had a more serious application in mind: It intends to go after the intranet data mining market with Project X.

"It works with any HTML file, and by representing the data graphically you can go through layers of data much faster than you can using existing technology," said one user familiar with the technology. "It can take hours to go through loads of data on the Web, and you still might not have what you need. This can give you a much better picture of the data much faster."

The technology is expected to be a commercial product by the end of this year or early next year, said Frank Casanova, manager of Ap-

ple's research labs. Later, the company intends to improve the data representation with full 3-D graphics, sources said. Apple hopes to line up support from major data-base vendors before shipping the product, Casanova added.

Apple is also building on its investment in OpenDoc component technology to offer corporate customers shrink-wrapped applications. Later this year Apple will bundle a number of third-party components and offer them as vertical market solutions, according to Gini Centoni, the OpenDoc product line manager at Apple.

The bundles will include viewers for QuickTime and QuickDraw 3D applications, Java applets, and Netscape Navigator plug-ins, Centoni added.

Some of Apple's initiatives announced last week, however,

seemed to miss the mark for corporate users. A purse-shaped portable — incorporating a 10.4-inch active matrix screen, a full-size portable keyboard, and a pad and stylus

for handwriting input — along with handwriting recognition software, according to sources — failed to convince some users that Apple now understands the needs of the corporate world.

And Apple's plan for introducing OS upgrades on a near-continuous basis, approximately every six months according to Amelio, raised some questions.

"It makes it sound more like a tactical plan than a strategic one," said Richard Doherty, founder of market research company Environmental Inc., in Seaford, N.Y.

"I don't think they've given enough thought as to how to position this idea for corporate IS managers," Doherty added.



APPLE CEO GIL AMELIO

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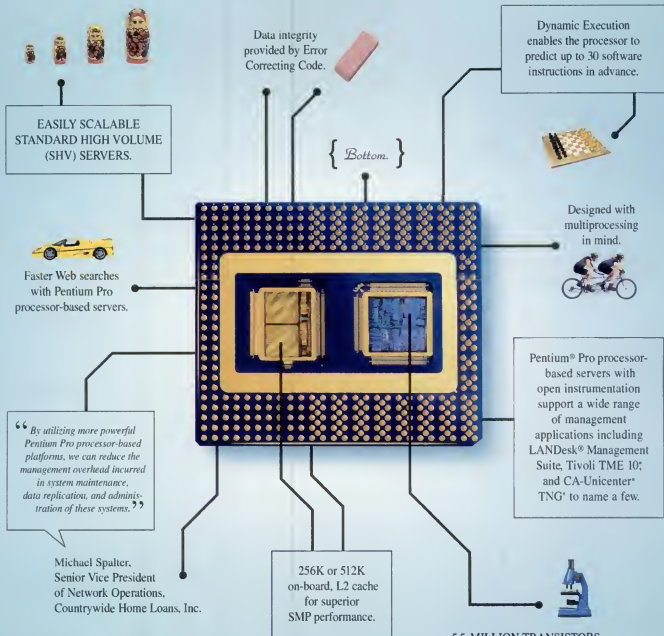
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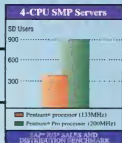
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# PEP LINE PRICE CUTS

Icon Electronics Inc. announced

the equivalent of a price cut on its Millennia and Millennia Pro PC lines, by doubling the memory capacity without a price increase. Micron's entry-level Millennia features 32MB of Extended Data Out RAM, increased from 16MB of DRAM. The price remains \$2,399. (800) 515-9197, www.lexmark.com.

LEXMARK INTERNATIONAL INC., in Lexington, Ky., announced a price cut on its Color Jetprinter 2070, reduced to \$349. The 2070 has a print speed of 1 page per minute (ppm) for a page with 90 percent color saturation and 7 ppm for black and white. (800) 358-5835; http://www.lexmark.com.

## SHIPPING

MAPIFLO CORP. will ship this week MapiFlo Professional 4.1, a client/server desktop mapping and data visualization package for Windows 95 and Windows NT. New connectivity with Oracle and Sybase, as well as Microsoft Access, allows users to quickly read and write spatial data to these databases. The product will cost \$1,295; upgrade pricing has yet to be announced. (800) 426-0520.

KINGSTON TECHNOLOGY CORP. shipped last month memory upgrade modules for Toshiba Corp.'s Tecra 500CDT/C5 series of notebook computers. The 8MB module costs \$190, the 16MB version costs \$355, the 32MB model costs \$695, and the 48MB module costs \$995. (800) 337-8410; http://www.kingston.com.

## ANNOUNCED

TSENG LABS INC. and 5-MOS SYSTEMS INC. announced last week an agreement to jointly develop multimedia computing display systems based on Tseng's ET6000 two-dimensional graphics accelerator and 5-MOS' PIX 3-D rendering engine. A timetable was not announced. Tseng: (215) 968-0502; 5-MOS: (408) 922-0200.

# CLIENT

## Microsoft speeds up graphics

■ Talisman accelerator will add high-end 3-D features to PCs

By Tom Quinlan

MICROSOFT CORP. graphically depicted its future at last week's Siggraph show in New Orleans, and its future seems to be graphics.

Grabbing the lion's share of interest from attendees was Microsoft's announcement of a hardware reference design, code-named Talisman, that will bring an unprecedented level of two-dimensional and 3-D acceleration to the PC, according to Microsoft officials.

Microsoft's other announcements included the licensing of Virtual Reality Modeling Language (VRML) 2.0-enabled browser technology from Dimension X Inc. (see "Microsoft backs VRML," Aug. 5, page 1); the first implementation of OpenGL 1.1 for Windows NT; and a beta version of its DirectX 3D API that supports Intel Corp.'s MMX multimedia extensions.

The hardware accelerator platform is designed broadly to bring the same type of features usually

associated with high-end workstations, such as rendering, texture mapping, and Z-level buffering, to the PC at consumer prices, making Windows 95 and NT into better graphics platforms for everything

### Microsoft Corp.'s Siggraph announcements

- Talisman hardware graphics reference design for accelerated two-dimensional and 3-D graphics
- Licensing Virtual Reality Modeling Language 2.0 browser technology from Dimension X Inc.
- Implementation of OpenGL 1.1 for Windows NT
- Beta version of DirectX 3D API with support for Intel Corp.'s MMX multimedia extensions

from games to engineering and scientific applications.

Although Microsoft is reluctant to provide a laundry list of specifications for a product that won't be out in prototype form until early 1997, it does expect that the changes it's making in the DirectX 3D API to enhance the hardware platform will

enable the company to compete with high-end graphics solutions.

Some changes, such as support for Intel's MMX and Accelerated Graphics port, are widely available, but others, such as sharing 2-D and 3-D file data to improve performance, are enhancements to DirectX that Microsoft is still developing, said Kevin Dallas, DirectX marketing manager.

"We're able to do some things that can dramatically improve the performance at consumer-oriented prices," Dallas said.

Microsoft is making the technology available to hardware manufacturers at a nominal fee, Dallas said. Those manufacturers are free to use portions of the Talisman design, or they can just copy the reference platform and sell it, he added.

A representative of Intergraph Corp., one of the pioneers in using the Intel-based NT platform in the workstation marketplace, expressed

► TALISMAN page 30

## 3-D graphics software

# Template has designs on 3-D Web pages

By Chris Jones

TEMPLATE GRAPHICS Software will give Webmasters some 3-D leverage later this year with the release of 3Space Publisher, a point-and-click 3-D design and authoring application for Windows 95 and Windows NT.

geometric shapes, all of which have default colors, textures, and lighting that can be changed by a mouse click. The program also has tools for creating objects, such as spherical buttons and bullets.

Analysts said 3-D is still new on the World Wide Web, and designers will have to assess the value of adding 3-D elements to Web pages.

"There's a lot of excitement about 3-D, but few people using it," said Kathy Klotz, an analyst at Dataquest Inc., in San Jose, Calif. "I could see intranet applications for 3-D, but for all the labor and bandwidth, you have to ask, is it worth it, and will it give me real benefit?" Klotz added.

3Space Publisher has five movable lighting types and creates lighting effects with a tool that reproduces shadowing and light reflection from objects in a scene. Cameras can be positioned at various focal lengths from telephoto to wide-angles. Special effects in-

clude colored and image backdrops and gray fog.

3-D scenes and images can be published as documents or CD-ROMs, and on the Web as Virtual Reality Modeling Language (VRML) files. 3Space Publisher will support the VRML 2.0 standard.

3Space Builder for Win95 and NT will be available in the fourth quarter for \$295.

Template Graphics, in San Diego, can be reached at (619) 457-5359.



3SPACE PUBLISHER gives users a point-and-click environment for creating 3-D scenes.

3Space Publisher lets users design 3-D scenes using pre-built objects that can be customized and integrated in Web pages, CD-ROMs, or business presentations.

3Space Publisher includes a drag-and-drop 3-D clip art library, with images such as cars, people, and

# NT SYSTEMS MAKE MOVE TO WORKSTATIONS

By Carolyn April

and Judy DeMocker

FROM HIGH-END to low-end graphics workstations, Windows NT rules the day seemed to be the message from both new and well-entrenched workstation vendors at last week's Siggraph show. NT workstations that will run engineering and scientific applications will be coming from Digital Equipment Corp., IBM, Hewlett-Packard Co., Compaq Computer Corp., and a relative newcomer to the market, Netpower Inc.

IBM confirmed it will announce uni- and dual-processor products that will ship in September and be based on the 200-MHz Pentium Pro chip. The systems will include either the 3Dmon graphics card from Omnicon Graphics Corp. or a graphics board from Maxis Corp., as well as remote management and configuration software called Wake-on-LAN. According to the company, the systems will be aimed at industrial customers.

HP will unveil this month one- and two-way workstations based on the 200-MHz Pentium Pro with 256KB of Level 2 cache and 64MB to 512MB of RAM for less than \$10,000. The workstation will use a single PCI bus architecture. According to a company source, the systems will focus on the technical market with "excellent 3-D graphics capabilities." The systems are scheduled to ship by mid-September.

Digital will announce Alpha-based NT products and Intel-based graphics workstations. Sources said

► NT SYSTEMS page 30

## InfoWorld Street Prices

### 600-dpi monochrome laser printers

Model	RAM	ppm*	Low	High	Average	Change from May
Apple LaserWriter 12/640 PS	4MB	12	\$1,479	\$1,399	\$1,539	N/A
Brother LP-1250	2MB	12	\$977	\$1,200	\$1,109	-1%
Canon LBP-1250	2MB	12	\$1,199	\$1,249	\$1,220	-2%
HP LaserJet 4M Plus	6MB	12	\$1,339	\$1,699	\$1,510	-18%
HP LaserJet 5M	6MB	12	\$1,649	\$1,800	\$1,740	-None
HP LaserJet 5N	4MB	12	\$1,435	\$1,600	\$1,526	-1%
Lexmark Optra R+	2MB	16	\$1,200	\$1,414	\$1,299	-6%
Okidata OI-1200	2MB	12	\$935	\$1,100	\$1,009	-4%
Ti MicroLaser PowerPrint 32	3MB	12	\$1,188	\$1,499	\$1,373	+1%

InfoWorld Street Prices are based on telephone surveys of resellers and on print advertising in computer publications and regional newspapers. Price information was collected between July 20 and Aug. 3.

1. Pages per minute.

2. Model not included in May pricing survey.

# NT systems

Continued from page 29

the Alpha product will use Digital's new 500-MHz chip. The Intel-based product will feature uni- and dual-processors using a 200-MHz Pentium Pro chip, and it will ship in September.

Seeking to siphon market share from Unix workstation vendors, Compaq will unleash a

complete family of NT-based personal workstations in the fourth quarter.

To that end, the Houston-based PC giant has established a workstation business division within its Enterprise Computing Group. The division plans to announce next quarter a full lineup of products that will be based on Intel's Pentium Pro architecture and Microsoft's just-released NT 4.0.

From a business perspective, analysts applauded Compaq's workstation endeavors. "It looks to me like Compaq is taking this

seriously by setting up a separate division," said Andrew Felt, director of advanced desktop computing at Dataquest Inc., in San Jose, Calif. "[Hewlett-Packard] has a better understanding of the market, but Compaq's name recognition and image for quality and service are all in [its] favor for this space."

Compaq has also inked partnership deals with graphics board and 3-D accelerator vendors Intergraph Computer Systems Corp., in Huntsville, Ala., and Elsa Inc., in San Jose. Both companies will provide technologies for

Compaq's workstations.

"This really formalizes what we've been talking about this year, to become a full-range computer company," said Michael Berman, a Compaq spokesman. "We're not going into the mainframe business, but we are going after that distributed enterprise."

Compaq officials said they are counting on their workstations' open-standard architecture to ensure more enticing price points compared with those on proprietary Unix and RISC-processor-based systems.

**Netpower**, a small workstation company started in 1993 and based in Sunnyvale, Calif., was the first to announce a workstation product using Intel's 200-MHz Pentium Pro with 512KB of Level 2 cache.

Netpower's Symetra is priced at \$6,695 for a uniprocessor system with 32MB of Extended Data Out (EDO) RAM, a Fast and Wide SCSI hard drive, its new TrueFX Pro Texture mapped OpenGL graphics accelerator, and a 21-inch monitor.

The high-end \$25,595 dual-processor system includes 512MB of EDO RAM, a 4GB hard drive, and a graphics accelerator. All Netpower systems will ship in mid-September, company officials said.

IBM can be reached at (914) 766-1900. HP can be reached at (800) 637-7740. Digital can be reached at (800) 344-4825. Netpower can be reached at (800) 801-0900.

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## Talisman

Continued from page 29

interest in using the Talisman design for low-end consumer products but doubted the platform could take on graphics workstations.

"The professional graphics demands are so much different than those demanded by consumers, it's not likely the two will merge anytime soon," said David Farmer, product marketing director for Intergraph.

And Microsoft doesn't necessarily expect the Talisman design, which relies on DirectX APIs in large part for its performance, to be adapted for the high-end of the market anytime soon.

In that market, compatibility with OpenGL is currently a requirement, Dallas said.

Microsoft also improved its message in that arena with OpenGL 1.1, a revision of the graphics libraries originally developed by Silicon Graphics Inc. that "performs 400 percent faster in some cases," Dallas said.

That performance improvement is encouraging companies to develop products specifically for the high-end graphics workstation market built around NT.

3Dlabs Inc. has developed an extensible version of its Glint architecture, the Glint 550TX, that can perform as many as 1 million polygons per second when two of the boards are used in a parallel manner.

The 550TX, which is pin- and software-compatible with the Glint300TX, is expected to cost about \$1,500 for an entry-level product when it ships, said Neil Trevett, vice president of marketing for 3Dlabs. It is also compatible with Apple Computer Inc.'s QuickDraw 3-D technology.

Companies committed to supporting the architecture include Diamond Multimedia systems Inc., Radius Inc., and Netpower Inc.

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# TI, Sharp to support controversial heat of 150-MHz chip with cool notebooks

By Carolyn A. April

TEXAS INSTRUMENTS INC. and Sharp Electronics Corp. last week announced plans for notebooks sporting Intel Corp.'s freshly unveiled 150-MHz mobile Pentium processor.

To offset possible heat problems that have been widely predicted, both companies have

added in additional heat-dissipating solutions. (See "Intel's 150 gets cool reception," Aug. 5, page 8.)

The TI TravelMate 6050 weighs 6 pounds. Sharp's PC-9090 tips the scales at 7.3 pounds — the extra weight attributable in part to its fan-based cooling system. TI's unit incorpo-

rates a lighter magnesium heat plate to cool the hotter 150-MHz processor.

TI will bring its TravelMate 6050 system to market in early September. The 6050 will feature the faster chip, 256KB of Level 2 cache, 16MB of RAM, a 1.35GB hard drive, and a 12.1-inch Super VGA active matrix display.

The PCI-based notebook will also boast a 28.8Kbps modem and a dual-drive to house a swappable 15-speed CD-ROM drive, a standard floppy drive, and a second 2GB hard drive or second lithium ion battery. Multimedia features will include 16-bit sound and a Zoomed Video port. It will be priced at \$5,499.

Sharp's 150-MHz mobile Pentium-based notebook will be available in September. The PC-9090 will include a 1.8GB hard drive, 24MB of RAM, an integrated eight-speed CD-ROM drive, and a 12.1-inch XGA active matrix screen. Company officials said that the new model will be priced at less than \$6,000.

Although a number of vendors greeted Intel's new mobile processor with less-than-enthusiastic support, citing concerns about its capability to attract corporate buyers, both TI and Sharp signaled strong support.

"With Intel's 150-MHz Pentium processor and TI's lightweight design, [we think] the TravelMate 6050 redefines flexibility," said Steve Lair, vice president of worldwide marketing and sales in TI's Personal Productivity Products group.

TI, in Temple, Texas, can be reached at (800) 848-3927. Sharp, in Mahwah, N.J., can be reached at (800) 237-4277.

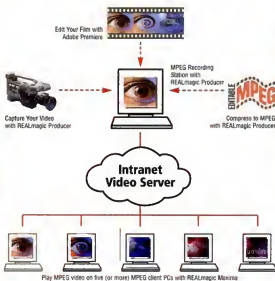
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## Olivetti and Acorn plan on bringing NC to market first

ITALIAN COMPUTER and telecommunications company Olivetti S.p.A. and its British affiliate, Acorn Computer Group Plc., are on track to release in September the first version of the Network Computer (NC) being championed by Oracle Corp., according to Raymond Lane, Oracle's president and chief operating officer.

"[Olivetti] is very aggressively moving into the market and getting into the channel by September," Lane said.

In conjunction with Oracle, Acorn developed the specifications for the NC concept — a low-cost Internet terminal device — and with Olivetti, it is set to market its own version of the product, called NetStation, in September, according to Lane and Acorn officials.

If Acorn and Olivetti stick to their schedules, they will be the first to market with the NC device, Lane confirmed.

Acorn, based in Cambridge, England, is developing the NetStation that Olivetti will distribute in Europe.

Acorn spin-off companies NChannel and NetChannel will be involved in the marketing of the product in Europe and the United States, respectively.

NetStation will be priced at less than \$500, Acorn officials said.

Olivetti can be reached at <http://www.olivetti.com/>.

Acorn is at <http://www.acorn.com/>.

—Rob Gable, IDC News Service, Tokyo.  
Additional reporting by Niall McKay, IDC News Service, London.



## WINDOW MANAGER • BRIAN LIVINGSTON

## Write any lines into the Registry upon start-up: reader enhancements

**R**EADERS OF MY COLUMN are always looking for new and better ways of doing things with Windows. Some of my best columns originate with the findings you share with me. This column is the result of just such a discovery — it describes a way to do something by using a method that differs from what I originally described.

This trick involves the Windows 95 Registry. Among other things, the Registry controls one of Windows 95's "adaptive" behaviors. This behavior involves the words "Shortcut to" that Windows tacks onto any shortcut that you create on the Windows desktop.

Typically, if you right-drag a file from an Explorer window to your desktop, Windows creates an icon for it with an icon title such as "Shortcut to Filename.ext." Oddly, if you delete just the words "Shortcut to" from five or six of these objects, Windows stops tacking on the words when you create new shortcuts.

In my May 20 column (see "You can stamp out the 'Shortcut to' link in Windows 95," page 33), I explained this behavior. What's happening is that the Registry is maintaining a variable called "link." The default value for link is 20 (15 hexadecimal). When you create a shortcut on the desktop, the value of link is increased by 1. When you remove the words "Shortcut to" from a shortcut, the value is decreased by 5. Therefore, five or six deletions are usually enough to set link to 0, halting the unwanted prefixed words.

Like Version 1.0 of many of Microsoft's efforts, however, this first shot at adaptive behavior has a serious bug. When you restart Windows, the value of link is reset to 20. Windows "unlearns" the behavior you taught it and starts tacking on "Shortcut to" all over again. Editing the value of link with RegEdit, therefore, is pointless, because you would have to perform the surgery every time you start Windows, which is more work than just deleting the dang words themselves.

By itself, this one flawed adaptive behavior isn't very important. But reader Brad Doster suggests a free fix that you may be able to apply to a lot of other Windows behaviors.

In my May 20 column, I recommended using a Microsoft applet called TweakUI to modify the "Shortcut to" behavior. After you install TweakUI, you run it from the Control Panel. One of TweakUI's tabs provides a setting to turn off "Shortcut to." You can download TweakUI, one of Microsoft's so-called PowerToys, by setting your Internet browser to <http://www.microsoft.com/windows/software/power toys.htm>.

But what if you don't have a modem? What if you don't have an Internet account? What if

you'd just like to know a powerful technique that allows you to make changes in the Registry automatically and without downloading any software at all?

Doster proposes that you place a three-line text file in your StartUp group. By naming this file LINK.REG, you cause its contents to be merged into the Registry every time you start Windows. (The default behavior for a .REG file is Merge.) In Notepad, type the following, with the keys in brackets all on one line:

```
REGEDIT4
[HKKEY_CURRENT_USER\Software\
Microsoft\Windows\CurrentVersion\
Explorer]"link"=hex:00,00,00,00
```

With LINK.REG in StartUp, the value of link is set back to 0 at the beginning of each Windows session.

This technique has wide application. For example, if you run Windows trainings, you can write a .REG file to reset certain Control Panel settings that students may have changed during your classes.

Specifically, if you plan to make changes to WordPad settings, you might look at the following branch of the Registry:

```
[HKKEY_CURRENT_USER\Software\
Microsoft\Windows\CurrentVersion\
Applets\WordPad]
```

By selecting this branch and then clicking Registry, Export Registry File from the main menu of RegEdit, you can save a text file containing all WordPad settings. (Name the file WordPad, and RegEdit will automatically create a text file called WordPad.reg.) This file will include the preferences you wish to use when viewing different file types, such as Word, RTF, and so forth.

After your training students have changed the WordPad setting to their heart's content, double-click WordPad.reg — or replace it in the StartUp group to run automatically — and the original settings will be restored.

This procedure is not a panacea. You can't remove lines that have been somehow written into the Registry in this way, for example. And it's not a good method for backing up and restoring your Registry. If you want a backup of the Registry for a rainy day, save a copy of the files System.da0 and User.da0 from your Windows folder to a floppy or tape (or, better yet, do a complete backup).

After a .REG file is run (manually or by the StartUp folder), Windows displays a dialog box saying the merge was successful. You can get rid of this dialog box with the RtvReco utility described in my July 15 column. (See "Exit maddening dialog boxes and buttons for good," page 33.) RtvReco is available at <http://www.infoworld.com/page/01/opinions/livingst/tvcreco.zip>.

I'd like to thank Doster for suggesting the use of the StartUp folder in this way. He receives a free copy of *Windows 95 Secrets*.

Brian Livingston is co-author of *Windows 95 Secrets* and author of three other Windows books (IDG Books). Send tips to [brian\\_livingston@infoworld.com](mailto:brian_livingston@infoworld.com) or fax: (206) 282-1248.



FOR REPEATERS AND ADAPTERS,  
TURN TO PAGE 37.



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Dept. IS

## ANNOUNCED

**S**ense8 Corp. last week announced a development environment for 3-D simulations and virtual reality applications. WorldToolKit Direct combines the development capabilities of WorldToolKit Release 6.0 with the real-time rendering of Microsoft Direct 3D, company officials said. Direct 3D is the next-generation 3-D rendering technology for the Windows 95 OS. WorldToolKit functionality is wrapped around the Direct 3D engine to improve the speed of simulations. WorldToolKit will be available by the end of December and will be priced at \$2,995. (415) 331-6181; <http://www.sense8.com>.

**BBN CORP.** last week announced it has chosen Microsoft Corp.'s FrontPage 1.1 as the preferred Web publishing tool for BBN Planet customers who create and host Web sites under the Windows operating system. Under an agreement signed by the two companies, BBN will exclusively bundle FrontPage with its Advantage Silver Hosting service for its customers using Windows. BBN Planet provides high-speed, dedicated, and dial-up Internet access; Web site development and hosting; managed Internet security; and network management. BBN: (800) 632-7638; <http://www.bbn.com/webhosting>; Microsoft: <http://www.microsoft.com/frontpage>.

**METROWERKS INC.** this week announced a new version of CodeWarrior for BeBox, the Be-native version of its Integrated Development Environment. The BeBox edition of CodeWarrior is designed as an application development system for BeOS, a multiprocessor-based OS introduced last year for integrating multiple PowerPC microprocessors into a single system. CodeWarrior for BeBox will be offered at a special price of \$149 and will ship in the first week of September. (800) 377-5416; <http://www.metrowerks.com>.

# APP DEV TOOLS

## Engineering tool expands

### ■ MicroGold updates graphical modeling product

**By Ted Smalley Bowen**  
MICROGOLD INC. has released an updated version of its object-oriented application-modeling tool for C++ and Delphi that allows developers to reverse engineer existing code and generate new applications in a variety of object-oriented languages.

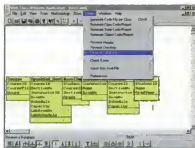
The Edison, N.J.-based company's With Class for Windows allows users to generate class, object, and state diagrams from existing code;

model applications; and, via a template-driven code generator, create source code in C++, Java, Tower Eiffel, and SmallTalk, in addition to SQL code, according to the tool's architect and MicroGold's president Michael Gold.

The modeling tool ships with about 30 customizable ASCII scripts for generating code. The 3.0 upgrade, which is currently available, adds the capability to reverse engineer Java code, pro-

vides support for the unified development method and OLE in-place editing, and provides improved Java generation, reverse engineering of Delphi code, and reverse engineering of SQL databases that include ODBC drivers, Gold said.

A follow-on release, slated for December, will add an object repos-



**MICROGOLD'S WITH CLASS** provides for reverse engineering of existing code.

itory based on Microsoft Corp.'s Access, OLE automation, reverse engineering of Visual Basic code, and

► **MICROGOLD page 36**

## It takes NT to Tango with EveryWare's online application builder

**By Chris Jones**  
EVERYWARE Development Corp. will offer its first Windows release later this month with the launch of Tango for Windows NT, a database development tool and online application builder.

Used primarily for online commerce, conferencing, and registration applications, EveryWare's Tango integrates ODBC databases with Web servers, letting users build search queries and construct forms in a drag-and-drop environment.

Tango uses wizards and templates to help users create Web pages without SQL or HTML programming, and information is updated in real time from Oracle, Informix, Sybase, and Microsoft databases. Applications can be written under Macintosh, Windows 95, or Windows NT but require the EveryWare SQL server for Macintosh, Windows NT, and Unix for development.

A third-party graphical HTML editing tool for developing graphical front ends to Web sites will be

available this fall, when Adobe Systems Inc. ships a new version of PageMill for the Macintosh. The tool will support EveryWare's tools and will enable users to refresh Web sites with live database information that feeds into specified areas of pages.

EveryWare has a range of Mac-based programs for developing Web sites with database integration, including Bolero, which logs Web-site activity in real time, and Merchant, which creates and manages store

fronts on the World Wide Web.

Henry Lach, vice president of marketing for EveryWare, said the company is developing software to create a "personal Web server metaphor," in which information is delivered based on parameters set by individual users.

Shipping Aug. 31, Tango for Windows NT and Sun Solaris ranges in price from \$995 for a five-user license to \$2,295 for unlimited users. EveryWare, in Mississauga, Ontario, can be reached at (905) 819-1173.

## Wallop beta hits developers with Web-site creation tool

**By Jeff Walsh**  
WALLOP SOFTWARE INC. launched the beta version of its new software this week, providing Web developers with a tool to manage all the multimedia components and devel-

oping and integration capabilities, allowing the entire Web development system to be conceived and maintained as a single entity. The beta version of Wallop is already being used by Global Village Communications Inc., Microsoft Corp., Netscape Communications Corp., Visa International Inc., and Cisco Systems Inc., according to Wallop officials.

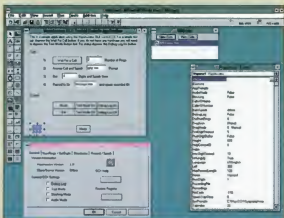
Wallop Software, previously known as NetBuild Inc., also announced it has recently completed a round of venture capital funding with Sequoia Capital and other private investors.

The product will ship by the end of December. No price has been set. Wallop Software, in Foster City, Calif., can be reached at (415) 341-

1177 or <http://www.wallop.com>.

### PRODUCT SPOTLIGHT

## VOYSSACCESS CAN TELEPHONE DATABASES



**V**oyss Corp., in Fremont, Calif., is shipping VoyssAccess 2.0, an ActiveX software-development toolkit providing 32-bit interactive voice response capabilities, enabling callers to query and modify database information over Touch-Tone phones. It supports Windows NT, Caller ID, 24 phone lines, Access, C++, and Delphi. In addition to Visual Basic and Visual FoxPro, which VoyssAccess supported in previous versions. Voyss is at (800) 786-9797.

# Penumbra ships Mojo visual toolset for Java

By James Nicolai

PENUMBRA SOFTWARE INC. last week announced that it has begun shipments of Mojo, a development environment for programmers using the Java language.

Observers welcomed Mojo as a handy, easy-to-use tool for working with the popu-

lar Internet-oriented programming language but contested Penumbra's claim that it provides a "complete" development environment.

"It doesn't appear to be a full-blown development environment like, say, Microsoft Corp's Visual J++ will be," said Tracy Corbo, senior applications development analyst at

International Data Corp.

"I'd call it a GUI builder for extending existing Java applets. It looks good for people who've maybe had a Java course but don't want to get into the nitty-gritty of the Java language," Corbo added.

Mojo consists of two modules: the GUI

Designer, for visually building Java applets, and the Coder, for organizing Java objects and gaining direct access to all aspects of the code.

At Logical Devices Inc., in Golden, Colo., developers have been using Mojo to develop on-entry software packages for the Internet.

"We've run into no hiccups," said Logical Devices' president, David Mot. "It's had no bugs and seems to be well designed."

Mot said he considered using Symantec Corp's Cafe but found it too cumbersome.

"We needed something for rapid development, something without a lot of coding," Mot said. "We didn't want to get into the whole language syntax thing. It helps to know some Java [to use Mojo], but you don't have to be a five-year Java programmer."

Users can drag and drop components from Mojo's library and add actions to them. The Coder allows the developer to go beyond built-in functions and organizes objects into a visible hierarchy for drill-down viewing and direct coding.

Mojo will run on Intel-based PCs running Windows 95 or Windows NT 3.51 or later, with at least 16MB of RAM, 30MB of free disk space, a VGA or better display, and a CD-ROM drive, Penumbra officials said.

Pricing for the single-user version is \$109, with a student edition priced at \$49.

The Enterprise Edition, including Java Database Connectivity and ODBC support, costs \$495.

All versions can be downloaded from Penumbra's Web site at <http://www.penumbra.com>, where a free trial version is also available.

Penumbra Software, based in Norcross, Ga., can be reached at (770) 352-0100.

James Nicolai is a Boston correspondent with the IDG News Service.

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A full two years after its release, Ositech's Jack of Diamonds (combination Ethernet + Fax + Modem PCMCIA card) is still winning accolades throughout the computer industry.

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New From Ositech:



## MicroGold

Continued from page 35

integration with Intersolv Inc.'s PVCS software configuration management and version management tool.

"The product is a time-saving tool for existing developers who have legacy C++ code or Delphi projects and who want to see what projects look like," Gold said.

"It's also used for training in object-oriented development and design and documenting existing code," Gold added.

Users greeted the tool with enthusiasm, lauding its time-saving capabilities.

"Having the graphical user interface to do our database application design and the tool to generate the code is more efficient than writing the model using an object-definition language," said Andre St. Jean, software development group leader at CAE Electronics Ltd., in Ville St. Laurent, Quebec.

The Professional version with Class 3.0 is priced at \$295.

The reverse-engineering module for C++ and Delphi with the capability to generate Java code is priced at \$99.

The Enterprise version is priced at \$395. MicroGold can be reached at (908) 668-4779 or <http://www.microgold.com>.

# SAS will extend reach of 'net support, development tools

By Ted Smalley Bowen

LOOKING TO MAINTAIN its corporate customer base and capitalize on object-oriented and Internet development trends, SAS Institute Inc. later this year will bolster its object-oriented development tools and increase Internet support for its flagship enterprise software suite.

The enterprise software company, which boasts an installed base of 29,400 sites, recently added HTML support to its suite and is planning to add Web-based transaction capabilities, according to Deva Kumar, director of the company's display products division.

"We understand that the Internet is key to what our customers are looking into," Kumar said. "Some are approaching it more cautiously than others, but they want to deliver their applications. We're looking at providing transactions within the next year or so."

The suite spans data warehousing, data mining, application development, database management, and statistical software. SAS' development tools include the SAS Application Facility, an add-on module for object-oriented programming that uses the SAS

object model, and SAS EIS, the company's data warehousing and data mining module.

Version 6.12, which is slated to ship later this year, will add ActiveX support and an expanded list of business objects, Kumar said.

Although the development tools are specific to the SAS System, users lauded their flexibility in handling multiple data types.

"You're not restricted to writing against SAS data. You can also access Oracle, Sybase, or other data types," said Mike Durbin, supervisor of information systems in the finance group at Purina Mills Inc., in St. Louis. Durbin noted that the tools need to be easier to use.

"There's a steep learning curve to work with the tools at first, but they are very flexible once you get past that," Durbin said.

SAS last month announced plans to add Web support to its data warehousing products and will continue to add Internet capabilities to its development tools.

"We have 5,000 dealers across the country. It would be nice to be able to distribute things like price lists online," Durbin said. "But that kind of development is probably down the road."

SAS, in Cary, N.C., is at (919) 677-8000.

## Development tools

# iXpress tool to deploy apps to Web

By Mark Leon

SOFTWARE AG HOPES to integrate corporate information with information on the World Wide Web by offering a suite of new development and deployment tools.

The iXpress suite consists of PageManager, a tool for building Web page management applications, and PageServer, a middle-tier application server. Users can develop applications that access back-end databases through ODBC, ActiveX controls, or OLE automation and display the results in a Web browser.

In the iXpress architecture a Web server acts as a PageServer client that shields the Web server from database access, thereby getting around the thorny problems associated with replacing existing client/server protocols with HTTP. More offerings are on the way.

"One of the huge disconnects in deploying applications over the Web is the commercial Web server, which has no concept of state," said Evan Quinn, an analyst at International Data Corp., in Framingham, Mass. "Most database engines expect a persistent connection, which HTTP can't handle, so we are seeing a proliferation of middleware to form that connection."

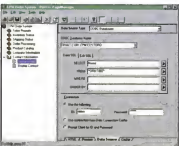
PageManager gives Webmasters a visual tool to create and manage HTML-based applications that communicate via the Web server to PageServer, which communicates with the database. PageManager wizards automatically create HTML pages with embedded database access links called Dynatags.

PageManager software can access the data-

base directly or through legacy applications, such as Cobol programs containing business logic that has accumulated over many years.

Users liked the ability to deploy mainframe applications on the Web.

"We plan to use it to access our legacy systems. It's a unique application development tool, and we expect to find more areas in which



**PAGEMANAGER** can embed Dynatag links to legacy databases in HTML pages.

to use it," said Geno Baruffi, a University of Hawaii computer specialist, in Honolulu.

Analysts agreed this is a unique tool.

"As an app dev environment it's not meant to compete with Java or lower end development packages from companies like Borland," Quinn said. "They may be on the leading edge of a new type of server development tool."

iXpress is available now. Prices start at \$7,500. Software AG, in Reston, Va., is at (800) 843-9534.



FOR FAST ETHERNET SOLUTIONS,  
TURN TO PAGE 43.





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## ANNOUNCED

ona Technologies Ltd. announced OrbixWeb 2.0, a CORBA-compliant object request broker that supports Java- and C++ language bindings and server development. OrbixWeb 1.0 currently supports Java and ActiveX standards. OrbixWeb 2.0 will enter beta testing in September. (617) 679-0900.

## SHIPPING

UNISQL INC. is shipping Unisql for Windows, Windows client software for its object-relational database. The software lets users access the Unisql Server from Windows 3.1, Windows 95, and Windows NT. It includes Visual SqlX, a query and schema tool, and support for Visual Basic. Prices start at \$375. (800) 451-3267.

INFORMATION DISCOVERY INC. and UNISYS CORP. are shipping Inter Knowledge, intranet-based decision support software for the financial industry. The product combines Information Discovery's data-mining tools with Unisys' expertise in the financial sector. Users can view reports on the World Wide Web in newspaper format with 3-D graphics. Prices start at \$50,000. (310) 937-3600.

DATABASE SOLUTIONS CO. released a new version of its database performance management toolset, called TPM 96, which helps database administrators gather performance statistics, forecast problems, and fine-tune databases for optimal performance. TPM 96 manages Oracle, Sybase, and Microsoft SQL Server databases. Prices start at \$1,995. (800) 933-7668.

FILENET CORP. shipped a new version of FileNet Document Warehouse for SAP AG's R3 for NT. The product lets users capture, process, and store document images and related information from R3 2.1, 2.2, and 3.0 applications in a single repository across the enterprise. Pricing starts at \$50,000 for 16 users. (800) 345-6368.

## SERVER

## Distributed applications

## Vendors extend DCE systems to Web

By Ted Smalley Bowen  
DISTRIBUTED COMPUTING Environment (DCE) vendors and the Open Group, which oversees the DCE standard, are looking to apply DCE security and distributed file services (DFS) to the burgeoning Internet tools market.

At the OSF DCE Conference last week in Boston, the Open Group (a merger of X/Open Ltd. consortium and the Open Software Foundation [OSF]) detailed its Java project, JADE (Java and DCE Enhancements), and OSF DCE Web, a set of technologies aimed at bringing DCE security, naming, and integrity services to the World Wide Web.

JADE provides secure communications between Java clients and Web servers by tapping into the Kerberos-based security of the DCE remote-procedure calls. JADE also makes the standard DCE API available to Java applications through a set of native classes, Open Group officials said.

Developed by several DCE vendors, OSF DCE Web comprises the Secure Local Proxy server-based proxy; Secure Sockets Layer integration via the Secure Domain Gateway; and the DCE web server, a front end to off-the-shelf Web servers that provides DCE-secured,

file-level access.

The Open Group is working with IBM and Digital Equipment Corp. to bring messaging and queuing services to DCE. It is also working with Digital, Hewlett-Packard Co., and Lexis-Nexis to develop C++ class libraries that provide DCE services, said director of product marketing Joe Maloney.

Though DCE continues to gain features, the Open Group's approach to Web-software developers might be too rigid, said one analyst.

"They need to be more flexible. They have to appeal to these [Web development] guys," said John Rymer, an analyst with Giga Information Group Inc., in Cambridge, Mass. "Right now, their drumbeat is that they offer the best secure middleware alternative. They're basically saying 'Here it is, you can implement it.' [Web developers] need to be able to start small."

Because DCE is positioned to work with both the Object Management Group's CORBA standard and Microsoft Corp.'s Distributed Component Object Model (DCOM), some corporate developers are looking at DCE as a way to integrate both object models in Internet and other distributed applications.

"We have a large legacy business

of mainframe systems. We're studying advanced technology for our intranet and for when we provide Internet services. DCE can provide the flexibility of supporting CORBA and DCOM," said Martin Luna of Advanced Technology

Group at T. Rowe Price Services Inc., in Baltimore.

Among other announcements last week, IBM unveiled DFS Web, Web-server software based on OSF DCE web technology that adds DFS

» DCE page 40



## THE BUG REPORT

Server bugs and fixes reported to Buglist

► **Windows NT 3.5, 3.51** When you use Windows NT 3.5 or 3.51 Backup to back up a mirrored, fault-tolerant Windows NT file system on a multi-processor PC, you may receive the error: "Stop: 0x0000000A IRQL\_NOT\_LESS\_OR\_EQUAL." The reason, according to Microsoft Corp., is that "the Windows NT Kernel has a small window for error where two CPUs can access the same memory at the same time and perform out-of-sequence processing." Microsoft is working on a fix.

► **Microsoft Exchange Server 4.0** During installation of Microsoft Exchange Server 4.0 with Windows NT, you may receive the error: "Unable to configure the Windows NT Natural Language for the telex codepage." The problem is that the System32\i18n\2061.nls file is marked read-only, as apparently happened with some units shipped from Microsoft. The workaround: Confirm that Windows NT Service Pack 4 has been installed and then make sure that i18n\2061.nls is not marked read-only.

► **Novell NetWare** If you run Novell NetWare and back up with a program such as Syntex Plus, you may be sorry to learn that you may not normally be backing up your NetWare bindery. If you suffer a hard-disk crash, this can be a major pain. The way to avoid trouble: Add a BINDFIX command to the batch file that runs your backup every night, thereby ensuring that you will have a current copy of the bindery on the backup.

For more bug reports, browse to <http://www.bugnet.com>, or send e-mail to [bugnet.com](mailto:bugnet.com).



**HOTSEAT** Duncan Campbell, of HP's Network Server Division, walks the line between Windows NT and Unix

# HP drives NT, coasts on HP-UX

ALTHOUGH considered a platform vendor and competitor to Microsoft Corp., Hewlett-Packard Co.'s Network Server Division is betting big on Windows NT. HP's partnership with Intel Corp. to create the Merced processor, which has binary com-

patibility with all Windows applications, and HP's long experience in enterprise computing position the vendor as a key force behind Windows NT. HP's partnership with Intel Corp. to create the Merced processor, which has binary com-

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It's better to have a bit of overlap yourself than to leave gaping holes for your competition

What kind of business problems do IS managers in charge of servers face? As environments become increasingly more complex and more diverse, the concept of both local and remote management is absolutely critical to our customers. Our strategies with our OpenView products and applications that plug on top of that are of utmost importance.

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» HOTSEAT page 40

# Hot Seat

Continued from page 39

get the first priority.

The second key priority is just addressing the high-availability requirements as these applications become more critical. So, for instance, our recent Pentium Pro LX products have things like, not just hot-swappable disk

drives, but hot-swappable power supplies, redundant fans, and systems with memory scrubbing so they fix their own memory problems. They can actually really keep functioning if the CPU fails — as well with our fault-resilient booting.

So just what comes to bear on the marketplace with Pentium Pro is tremendously exciting and really kind of enriches what we can do on the high-availability front. This is being complemented by what we're doing on the

software side with our clustering, using Microsoft's Wolfpack APIs, which provide high availability as well.

Also, we are working on different implementations of security and determining how this becomes more of an issue as people start to deploy things like intranets and look for Web-based management activities.

**How is HP going to ride the crest of the Windows NT wave and not cannibalize its HP-UX business?**

That's a very fair question that a lot of people right now have been asking HP and HP's been asking itself. And I think the only way to respond to that it is twofold. First, it's much better to have a little bit of overlap yourself than to leave gaping holes for your competition. So yes, the Windows NT — especially with Pentium Pro — products have raised the bar. Not just against our HP 9000, but against the Unix business from an industry standpoint. So, in fact, [Windows NT] is now really a midrange computer-class competitor. Second, Windows NT has definitely caused the HP 9000 family to raise its own performance levels with the HP PA 8000 chip.

**With the merging of HP and Intel-chip platforms, where does HP-UX live?**

What we're driving on, from a product and technology point of view, is to make sure that we do have a consistent platform from bottom to top. That allows the customers to choose between NT and Unix. NT can move up as far as it wants, and that's going to be driven by the customer. Unix can move as far down as it wants, based on the performance needs. This is the conceptual model we'd like to get to.

**Are there several PC vendors creeping into the application-server business?**

This is a very good point. If you step back and understand things from an Intel standpoint, I think it's extremely significant when Intel system vendors arrive on the scene, which they have done recently in the Internet and intranet marketplace.

To me it means that the market is ready for mass volume, and, in fact, certain parts of it [are ready for] commoditization. So other vendors in this space, who have been in here before — some of the RISC vendors — need to step up their value add, because once the Intel vendors recognize that this is now right for market penetration, look out!

## DCE

Continued from page 39

file-level security to standard Web servers, permitting organizations to manage the access capabilities of Web-browser users.

DFS Web, which is slated to ship in the first quarter of 1997, is designed to bolster the relatively limited security capabilities of Web servers by adding password protection and encryption.

IBM will also release a single-sign-on DCE product later this year.

Transarc Corp. last week announced its DFS Lite, a Windows-based, thin-client access module for DFS files. The Windows 95-, Windows NT-, and Windows 3.11-compatible release is scheduled to ship later this quarter, with prices starting at \$150 per seat. The Pittsburgh-based developer will add Java-enabled clients to its desktop DCE and Encina transaction-processing software line, according to company officials.

Intellisoft Inc. also rolled out OSF DCE-based software last week with its DCE Snares, which provides DCE security for any TCP/IP application through a server- or client-based DCE proxy and firewall driver managed from a remote security console.

# Window To Your Mind's Eye

Samtron's 17" monitors offer pictures so crisp, so clear, they truly provide a window to your mind's eye. Winner of *Byte Magazine's* Best Monitor Overall for Image Quality award, praised by *Windows Magazine* ("You'll Like What You See") and highly recommended by *PC Digest & Ratings Report*, Samtron's 17" monitors offer flicker-free resolution, sharp edge-to-edge focus and energy-saving features perfect for the home or office.

And they just got better. Our next generation of 17" monitors, the SC-728FXL and SC-726GXL, feature digital on-screen controls, ergonomics and 15.7" viewable, flat-square screen

displays with fine dot pitch. Plus, they're both Plug & Play compatible making them ideal for use with Windows 95. In addition, both models offer Dynamic Focus for maximum clarity, INVAR Shadow Masking for increased brightness with less distortion and a ClearScreen Coating™ which reduces screen glare, eyestrain and fatigue. All this, and a limited 3-year warranty, at pleasantly competitive prices.

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SAMTRON

## Pilot Software leverages Java, ActiveX for OLAP on the Web

By Mark Leon

PILOT SOFTWARE INC. is extending its decision support software to give users online analytical processing (OLAP) and data-mining capabilities on the World Wide Web. Pilot Internet Publisher will let a Web client browser reports over the Internet and build sophisticated OLAP applications using ActiveX and Java, such as downloading multidimensional data cubes onto PCs for analysis offline.

A Visual Basic-compatible scripting language ties objects together and builds client interfaces.

Analysts expect more Web analysis tools.

"I think the intranets are opening up some interesting avenues. We are still in the early stages, but as power and bandwidth increase, these tools will become more robust, and you will start to see more of them," said Paul Olson, an analyst

with Database Decisions Inc., in Newton, Mass.

New technologies will give users sophisticated Web front ends to multidimensional data.

"Ultimately, we are going to want to deploy the ActiveX and Java functions," said Pilot user George Kossil, project leader for decision support at Monsanto Co., in St. Louis. "Our sales force will want the ability to do their own analysis, and now we have the infrastructure to do that."

Users can download personal, multidimensional data cubes, a convenience for users not permanently connected to a database.

"It's a great feature for our remote sales force," Kossil said.

Pilot Internet Publisher will ship by year's end.

Prices start at \$10,000. Pilot can be reached in Cambridge, Mass., at (617) 374-9400.

## BEA will deliver a Jolt to Tuxedo

■ Java-based interface will go into beta testing this fall

By Mark Leon

BEA SYSTEMS INC. is ready to expose commercial applications to the World Wide Web with new extensions to its Tuxedo middleware and has picked up some significant new partners.

BEA's Jolt is a Java-based interface to Tuxedo that will support any Tuxedo-enabled application. It will let users perform transactions with any Java-enabled browser or stand-alone Java application.

At the heart of the Jolt application is a new architecture that isolates back-end systems from Internet-connectivity problems.

The Jolt server runs alongside a Web server. When the Web server receives a home-page request, it sends the page back to the client with an embedded Java applet. When the user activates the Java applet, the Jolt server takes over and

the Web server drops out of the picture. Jolt uses a lightweight BEA proprietary protocol to process the transaction.

Users have the option of using HTTP for communication between the client and the Jolt server, but performance will be much slower, according to company officials.

"We are talking to JavaSoft about standardizing our protocol," said Alfred Chuang, BEA executive vice president and chief technical officer, in Sunnyvale, Calif.

Jolt appears to answer some user needs in deploying Web applications.

"We got a look at [Jolt], and it was pretty impressive how they could build a Java applet on the fly," said Michael Prince, chief information officer with the Burlington Coat Factory, in Burlington, N.J.

"Our strategy is to enable every-

thing to run on a browser, and their approach with a thin client and three-tier architecture fits our philosophy," Prince said.

Analysts said BEA has a lead on the competition.

"I haven't seen anything like this in [NCR Corp.'s] Top End or [IBM's] CICS," said Jim McLaughlin, an analyst with Giga Information Group Inc., in Santa Clara, Calif.

BEA has already picked up some significant Jolt partners, including Hewlett-Packard Co., Digital Equipment Corp., and Sun Microsystems Inc. HP will add Jolt to its suite of Internet and intranet electronic commerce products. Digital will resell Jolt for Digital Unix.

BEA will release a beta version of Jolt in September.

Jolt will ship in November, priced starting at \$3,000.

BEA can be reached at (408) 734-4000.

► Tandem Computers Inc. has licensed Tuxedo as the middleware for its upcoming line of Windows NT-based clustered servers.

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## HELP DESK • BRETT GLASS

# A sure way to avoid WinWord.Concept macro virus: Use a different program

**A**FTER MY JULY 22 column on the WinWord.Concept macro virus appeared, I received hundreds of e-mail messages containing pleas for help, workarounds, and containment strategies. (See "Caution: Attached WinWord file you receive via e-mail may contain a virus," page 42.) I also received many helpful tips on how to handle the virus, as well as advice from Microsoft Corp. itself (which has suffered recurring internal infestations that are apparently at least as serious as anyone else's).

The ability to create macro viruses has actually been around for a long time. Ten years ago, when I learned that many spreadsheet programs let you define a startup macro, I created a self-replicating macro that performed auditing functions. But I made sure my creations didn't spread; they would not run at all unless a file by a specific name existed in the machine's root directory.

Here are some ways you can limit the spread of the WinWord.Concept virus. Unfortunately, almost all of them are specific to this one virus. If someone were to create an MSAccess.Concept or WordPerfect.Concept virus, it would require different countermeasures.

## Method 1: Don't use WinWord

The simplest way to prevent WinWord.Concept infections is not to use WinWord — either at all or on the suspect file. Microsoft suggests that you change the default application with which Word files are opened to Windows 95's WordPad — an accessory program that has no macro capabilities. WordPad won't detect or remove the macro, though; it just won't run it. Also, if your site — like many — is stuck with Windows 3.1, you can't run the Windows 95 WordPad. You can, of course, run another word processor that reads Word files.

## Method 2: Use a viewer

If all you're trying to do is see the contents of the file, you can also use a viewer that can display — but not edit — Word documents. Microsoft publishes one called WordView, available at <http://www.microsoft.com/msword>. There are also third-party viewers. Reader Tony Caine recommends a general-purpose file viewer called View, which can be downloaded via his Web page at <http://delta.com/arcaine>. If you'd like, you can make the viewer the default application with which to open Word files.

## Method 3: Use a virus checker

All the major anti-virus vendors added Win-

Word.Concept protection to their products this spring. The best ones watch as you download new files, catching the virus as soon as it arrives on your machine. However, because many vendors had to reverse-engineer the WinWord file format to provide this protection, their products don't detect every strain of the virus and sometimes cannot clean the infected document. Worse still, many don't discover the virus if it's inside a database of incoming mail maintained by an e-mail program. But some specialized programs, such as Scanmail, from Trend Micro Inc. (<http://www.trendmicro.com>), have now been created to help with this problem. Scanners may also miss viruses in Microsoft Office's Binder files. Finally, a "Trojan-horse" program that is simply destructive or a virus that doesn't use WinWord.Concept's peculiar macro names will probably slip past a virus checker. WinWord.Concept itself could easily be modified to mutate its macro names, defeating many of today's scanning methods.

## Method 4: Use an anti-macro macro

Microsoft has published a WinWord document template containing a macro that, in theory, will immunize your system against WinWord.Concept. It's called the Macro Virus Protection Tool, or SCANPROT.DOT, and it is available at <http://www.microsoft.com/msword>. It's also available on many BBSes and online services.

## Other miscellaneous tactics

Some users have reported that they've been able to stop the spread of the virus by write-protecting the file NORMAL.DOT, which is where the virus sets up shop. This seems to work with WinWord.Concept, especially if NORMAL.DOT is kept on a NetWare server and is protected by NetWare's (not DOS's) security mechanisms.

But don't rely on write protection to stop viruses in DOS/Windows systems; it takes only one system call to remove it.

Reader Ben Schorr points out that if you bring up the Options notebook by selecting Tools/Options, and select the Save tab, you'll find a check box that tells Word to prompt you whenever it's about to save NORMAL.DOT. This may alert you to the presence of a virus.

Finally, holding down the Shift key while starting WinWord will prevent start-up macros from running. But be careful; a deadly macro could still activate at some later time.

I'd like to be optimistic about the chances of defeating viruses such as WinWord.Concept, but the current trend toward transmitting objects (bundles containing programs and data) may make it more difficult to stop them. As with Java and JavaScript, it may be that the only way to contain pernicious programs is to severely limit the capabilities of our tools — something none of us wants.

Brett Glass' Help Desk answers business computing questions. To submit a query, call (800) 227-8365, Ext. 702, or send an e-mail message to [brett\\_glass@infoworld.com](mailto:brett_glass@infoworld.com). Visit his forum on InfoWorld Electric at <http://www.infoworld.com>.

FOR SERVERS AND SWITCHES,  
TURN TO PAGE 50-51.





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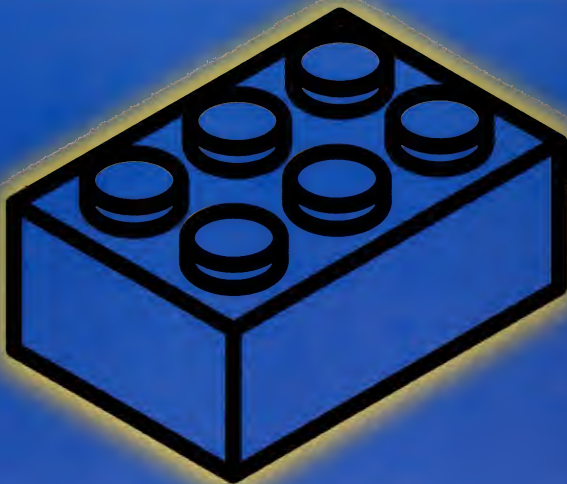
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## Stratus

**S**pyglass Inc. announced that SurfWatch, the company's Internet filtering software, will be bundled with the new Macintosh Performa 6400. SurfWatch allows parents and others to limit the types of sites children or employees can visit. SurfWatch screens Internet newsgroups, Web and chat sites, FTP (File Transfer Protocol), and Gopher. SurfWatch, alone, retails for \$49.95. (708) 505-1010; <http://www.spyglass.com>.

MICROSOFT CORP. and VERIFONE INC. announced that VeriFone's point-of-sale software would be incorporated into the Microsoft Merchant System to be used by retailers to set up virtual storefronts. Merchant System is presently in limited beta testing and is scheduled to ship by the end of the year. VeriFone provides credit card verification. Microsoft: (800) 426-9400; <http://www.microsoft.com>. VeriFone: (415) 617-8000; <http://www.verifone.com>.

TRANSCNET INC. unveiled last week new software that enables Java developers to access Web data and services with or without a browser. With the Web Interface Toolkit, developers can build Java class libraries to access Web pages. A free beta version of the toolkit is now available. A final version is due late September. Pricing is not yet available. (703) 426-0386; <http://www.transcnet.com>.

LSI LOGIC CORP. announced last week the ATMizer II, an Asynchronous Transfer Mode assembly and segmentation engine. The device integrates an embedded MMIO RISC CPU, enhanced direct memory access Segmentation and Reassembly engine, and scheduler module into a single chip for network cards, switches, bridges, routers, and protocol converters. Samples will ship in September, with full production in the first quarter of 1997, and will cost \$99 each in volume. (408) 433-8000; <http://www.lsi.com>.

## Explorer uses ActiveX to add functions

■ Microsoft hopes ActiveX will bring its desktop developers to the Web

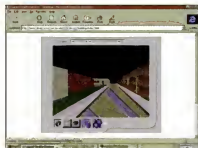
By Jim Balderston  
MICROSOFT CORP. will integrate or make available for download a series of new functions for Internet Explorer (IE) 3.0, bringing the company's Web browser to parity with Web rival Netscape Communications Corp.'s Navigator.

The company will unveil the new capabilities this week during the official launch of Internet Explorer 3.0, which went into an open beta distribution at the end of May.

The new third-party functions will include Web authoring tools, application development tools, a Virtual Reality Modeling Language (VRML) viewer, video-compression technologies, multimedia authoring tools, printer

controls, and graphics and document viewers — many from desktop developers.

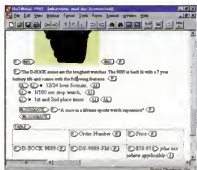
The third-party vendors used Microsoft's ActiveX controls to in-



**DIMENSION X** transforms IE 3.0 into a 3-D browser of VRML content.

tegrate their technologies into IE 3.0, a move that an industry analyst predicted will become common.

Harry Fenik, vice president of



**HOTMETAL PRO** brings sophisticated Web authoring tools to IE 3.0.

technology at the Redwood City, Calif.-based Zona Research Inc., said this week's announcement was a harbinger of things to come.

"I am not so sure that the list of companies signed on for the day of the launch is as significant as the fact that there is breadth to the types

of technologies being integrated with ActiveX," Fenik said. "What these companies are finding is that it is not a very large step from building a component for the desktop to making it an ActiveX control for the Web."

And that means a whole new band of developers, Fenik said.

"The developer community for the Web is no longer discrete from the developer community for Windows," Fenik said. "ActiveX allows them to become instantaneous Web developers."

Fenik said Microsoft would reap the benefits of ActiveX controls in the future.

"This is a big win for Microsoft, especially as it rolls forward," Fenik said.

The list of companies providing new capabilities to IE 3.0 includes Adobe Systems Inc., which will provide a viewer for Portable Document Format files; Micrografx Inc.'s application development tools; Narrative Communications Corp.'s Envision multimedia compression and streaming technology; VioNet Corp.'s VDOLIVE real-time audio and video viewer; and Macromedia Inc.'s Shockwave multimedia viewers. These companies also provide plug-ins for Netscape's Navigator browser.

Other companies offering new features to IE 3.0 via ActiveX include Sax Software Inc., with WebServer Control, which allows automated information retrieval; SoftQuad Inc.'s HotMetal Pro Web authoring tool; Summit Software Co.'s Web authoring toolkit; and Black Diamond Consulting Inc.'s 360-degree video Surround Video technology.

To date, developers have been licensing technologies such as ActiveX, Component Object Model (COM), and Distributed COM from Microsoft.

On July 31, Microsoft said it would hold a meeting of "stakeholders" in August to determine what is the best way to proceed with turning ActiveX into an independent standard. Last week, however, Microsoft backed down from its commitment to an August event and said the first meeting of stakeholders would be delayed at least a month or more.

## SunSoft waits for vendor support of WebNFS

By Paul Krill

SUNSOFT INC. IS FACING AN uphill battle to get its WebNFS protocol accepted by Web browser vendors that do not currently see the need to use the network file system (NFS) technology in their products for Web-based file access.

Major browser vendors Netscape Communications Corp. and Microsoft Corp. are shying away from WebNFS, saying that customers are just not interested.

"We didn't announce support for it because we don't have a role for it right now," said Marc Andreessen, chief technology officer for Netscape, in Mountain View, Calif. Customers are more concerned about information access than distributed file systems, he said.

Microsoft is maintaining a similar position. The company is waiting for customer demand for WebNFS while maintaining support of HTTP as the common method for file access via Web browsers, according to company officials.

A user of both Microsoft and Netscape Web browsers said Microsoft's Common Internet File System will be a better solution than WebNFS because it utilizes technology already supported in Windows desktops.

"If the Internet [community] de-

cides to standardize on NFS, then we're going to need two file systems on our desktops," said Paul Osterhoudt, software engineer at an aerospace company in San Pedro, Calif.

Janpieter Scheerder, president of

SunSoft, also based in Mountain View, said NFS presents a better way of accessing files.

"The current HTTP protocols are hopelessly inefficient in terms of getting files," Scheerder said.

## THE WEB HOTLIST

Web sites worth checking out

- Imation Online** <http://www.imation.com>  
Imation Inc., a 3M Co. spin-off, features information on its data storage and document systems products on this well-designed site. Areas to visit include Virus Education, Compatibility Guides, and CD-ROM Services.
- Information Builders** <http://www.ibi.com>  
Information Builders Inc. spotlights its application development, reporting, and data warehousing software. Learn about WebFocus, a server-based reporting environment for generating business information.
- Ariel** <http://www.ariel.com>  
Digital signal processing technologies are the focus of Ariel Corp.'s site. Get detailed information on computer telephony integration and Ariel's communications hardware, including high-density data modems.
- Softscape** <http://www.softscape.com>  
Softscape Inc. presents information on its productivity software products. Download a trial version of Softscape Explorer Plus, a desktop information management package designed for intranet users and developers.
- Power Express** <http://www.powerexpress.com>  
San Jose, Calif.-based Power Express Corp. offers an online catalog of batteries for portable gear such as notebook computers. The Battery Bible section contains tips on getting optimal battery performance — including how to "bury" your battery.

Send URL suggestions to [james\\_battery@infoworld.com](mailto:james_battery@infoworld.com)



FROM THE ETHER · BOB METCALFE

# Like it or not, advertising will pay for advances on the World Wide Web

ADVERTISING WILL SOON be a major source of the funds needed to pay for your Internet clients, transport, servers, and connection. Already in 1996, \$110 million of Web advertising is being sold, according to Simba Information Inc., in Wilton, Conn. (Search <http://www.world.com>.) That number is projected near \$2 billion by the year 2000. This is amazing when you consider the first Web ad was sold only last year.

These numbers are doubly amazing because they don't count what you're now already spending to grow [www.world.com](http://www.world.com) with all that advertising—err, I mean, purely factual information about your company's own very high-quality products.

Today, the state of the art in Web advertising is those colorful boxes—banners and medallions—that decorate many of the Web pages you frequently visit. Each displays a company logo or a catchy phrase. Banners often appear across the top of frequently visited pages, and medallions are arranged down the side of the

page. If you're reading this insightful column on the World Wide Web at <http://www.infoworld.com>, the medallions are over there at the right.

Banners and medallions are intended to attract attention and get you to move your cursor over and click on them—a process called a click-through. Nobody understands the marketing value of banners or medallions, but advertisers are now paying Web sites about 2 cents per click-through. Too bad that fewer than 1 percent of banners or medallions presented—impressions—ever get clicked. Too bad that many more sit unseen on "cobweb" pages.



Clicking on a banner or medallion often takes you to the advertiser's Web site. This is a problem for publishers because, despite your Web browser's back button, once you leave a site you are too likely to wander off. So emerging now are drill-down ads that with each click give you more of the advertiser's message without letting you out of the publisher's grasp.

The big problem with banner advertising is not knowing who's clicking. When a banner is clicked through by a child, for example, that's an event of much different value to an advertiser than when it's clicked through by, say, you, a qualified *InfoWorld* reader.

So the ad industry is developing tools for collecting click-through statistics, for identifying who's clicking through, for continually collecting the observed behaviors of clickers, and for having all that information audited by independent third parties. In short, they're busy covering the Internet into a measured medium, such as television, to assure returns on investments on Web ads.

Collecting information about the behaviors of Web clickers worries some people. I know. There's this personal privacy thing that gets them all worked up. And it's true that privacy will be abused, so let's be vigilant. But keep in mind how much less junk advertising will suffer when it can be better directed to only welcoming recipients.

A new idea in Internet advertising is ad servers. Imagine embedding in your Web page, not banner graphics, but links to banners that can be downloaded from an ad server. When your pages are downloaded, banner images would come along from the ad server. The ad server would be an outsourced facility through which ads might be sold, cre-

ative units collected, and downloads performed. Ad servers can download banners in rotation, randomly, and/or based on what is known about the person now looking at your page. An ad server might collect demographics on Web clickers so that the value of various banner clicks might be more rationally priced.



Of course banners are not the end all of Internet advertising. Ad agencies are working on new approaches—animated ads, for example, and somehow clicking banners to be downloaded in the background for deferred viewing.

Creative people at ad agencies lament the limitations of Internet bandwidth. They joke about watching television while waiting for World Wide Web pages to download. They'd really like the Web to perform as shown in the nBc-ATV WorldNet ads that ran on NBC-ATV during the Olympic Games.

Will the Internet ever perform that well? Yes, someday, but only if the money for a lot of Internet upgrades starts flowing accountably from successful Web advertising to Internet service providers.

*Bob Metcalfe invented Ethernet in 1973 and founded 3Com Corp. in 1979. He receives e-mail at [bob\\_metcalfe@infoworld.com](mailto:bob_metcalfe@infoworld.com) via the Internet.*

## Intranets provide results with little expense

By Niall McKay

IS MANAGERS around the world are finding that corporate intranets don't seem to drain IT budgets the way previous revolutions in computing have done.

"A paradigm shift, yes," said John Wodehouse, advanced informatics and technical specialist for Glaxo Wellcome Plc., in Middlesex, England. "But millions of dollars? No."

The installation of an intranet at Glaxo—the second largest pharmaceutical company in the world—has been inexpensive and easy, according to Wodehouse.

"We discovered that we had all the components in place," Wodehouse said. "The only thing we needed was to buy some Web servers and address the security issue."

There are several driving forces for intranet deployment, according to Kathy Burrows, research manager for International Data Corp. (IDC), in London.

"Firstly, most companies are using existing hardware and simply buying or downloading World Wide Web server software and authoring tools," Burrows said. "They

can experiment without investing a large amount of money. Secondly, a corporate intranet is a very cost-effective way to connect disparate software and hardware platforms."

At Molins Engineering Machinery International Ltd., IT Director John Lashbrook has found that to be the case. Molins has 17 sites across Europe, Asia, and the United States that are connected via an intranet.

"If we were to attempt this 10 years ago, it would have cost millions of dollars for the network connection alone," Lashbrook added.

The key enabling factor for Molins, according to Lashbrook, is that the company had deployed corporate-wide e-mail several years ago. "We just used the existing network infra that was already TCP/IP," Lashbrook said.

However, Lashbrook believes several factors have recently made the building of an intranet even simpler.

"Internet authoring tools have become a great deal easier to use," Lashbrook said.

HTML authoring is not the complicated issue it used to be.

"Anybody who can drag and drop can create an HTML document," said Andrew Spybey, United Kingdom press relations manager for Silicon Graphics Inc. "Now we are taking things a step further by offering off the shelf, pre-configured Web servers."

Although the major inhibitor for Molins was the security issue, it has solved this by installing Checkpoint Software Technologies Inc.'s Firewall-1 software, which encrypts documents sent via the Internet, Lashbrook said.

Internet and intranet database front-end tools and search engines will be the next killer business applications, according to IDC's Burrows.

"Tools that make life easier for corporations are Web relational database search engines and virtual reality viewing browsers," Burrows said.

*Niall McKay is a London correspondent for the IDG News Service.*

## Internet sales raise tax flag

■ State laws need online counterparts

By Lisa Nishimoto

ONE THING IS PROBLEM FOR proponents of electronic commerce on the Internet: How will states tax the sale of goods and services online?

In one of the early attempts by a state government to address the issue, the Florida Telecommunications Task Force met for the first time last week to begin crafting a new tax policy to govern Internet-related commerce. Under current tax law in many states, taxation of electronic transactions conducted over the Internet is very ambiguous. Many states apply tax laws that govern direct-mail catalog orders.

The U.S. Supreme Court has ruled that residents who make an electronic purchase from a vendor that does not have a physical presence in that state may be taxed by their state, but the vendor is not required to collect these taxes. Although this ruling prevents vendors from having to track the tax laws of 50 states, states often lose revenue because few residents realize that they owe taxes.

The Interactive Services Association (ISA), in Silver Spring, Md., (<http://www.isa.net>), has formed a group including Microsoft Corp., CompuServe, and America Online that will work

with Ernst & Young to develop an Internet white paper on state tax laws and electronic commerce. Another interest group, the Public Policy Special Interest Group, has been formed by CommerceNet (<http://www.commercenet.net>), a Palo Alto, Calif., consortium of vendors focused on electronic commerce.

"We need some clarity on what's taxable and what's not," said Bruce Reid, director of excise and property taxes at Microsoft.

"It's unlikely that the states are going to be able to create a system that functions fairly and well, and works for small businesses, and the federal government may need to step in and resolve this," said Kaye Caldwell, head of CommerceNet's Public Policy Special Interest Group.

ISA can be reached at (301) 495-4955 or [isa@isa.net](mailto:isa@isa.net); CommerceNet can be reached at (415) 858-1930.



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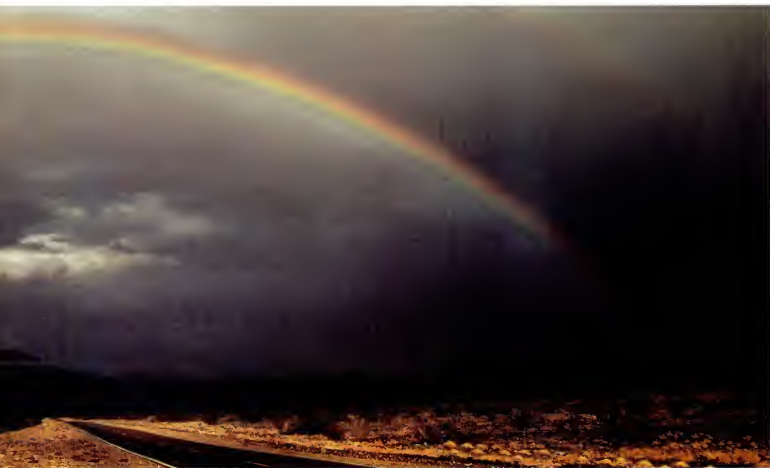
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ewlett-Packard Co. will offer in October add-on modules and software for its HP Internet Advisor LAN and WAN analyzer, which allows network managers to monitor traffic on Fast Ethernet and 155Mbps Asynchronous Transfer Mode (ATM) OC-3 connections. HP said the ATM modules comply with the ATM Forum UNI 3.0 and LAN Emulation specifications. Each hardware module includes embedded software and costs \$15,000. The analyzer, which runs on a custom portable computer running Windows 95, also supports Ethernet, Token Ring, and FDDI. (800) 752-0900.

## SHIPPING

TRAVELING SOFTWARE INC. this week will begin shipping an updated version of LapLink for Windows 95 with better synchronization and more remote control. The file synchronization feature, now called Xchange Agent, works with Microsoft Corp.'s System Agent to enable users to locally offered more inexpensive products than the major network hardware vendors. The CyberSwitch product line is an attempt by an established network player to exploit the burgeoning market for low-cost ISDN services that provide high-speed access to the Internet and to corporate intranets. Cabletron hopes that its installation software, dubbed QuickSet, will enable nontechnical users to get

D-LINK SYSTEMS INC. last week began shipping a network hub designed to give small workgroups 100Mbps Fast Ethernet connectivity. The ProFast 8-Port Hub is an unmanaged Fast Ethernet hub with a per-port price of less than \$125. The ProFast is designed to be used for applications that generate high-volume network traffic requiring guaranteed bandwidth, such as graphics, imaging systems, and CAD/CAM programs. The ProFast 8-Port Hub has a retail price of \$995. (800) 326-1688.

## Tivoli's association brings hope of unity

By Jeff Walsh

FOR MANY SYSTEMS and network managers, the thought of fully integrated management applications is a dream—one they don't expect to come true.

Tivoli Systems Inc. is launching an Integration Toolkit this week that will help its partners bring together their products. With companies adopting the Tivoli Management Environment as a standard, extra resources will not be necessary to ensure compatibility.

With Austin, Texas-based Tivoli's announcement of its 10/Plus Associ-

ation, composed of 450 industry-leading companies working together to integrate their applications, the dream is coming a little closer to reality.

"I have never seen a group come together in such a violent agreement as I have in these past few months," said Jim Corrigan, the president of Ki Networks Inc., in Columbia, Md.

"That we can get a working piece of code with companies who compete in the marketplace says a lot for the maturity of the industry," Corrigan said.

Paul Mason, an analyst with the International Data Corp., in Framingham, Mass., echoed Corrigan's enthusiasm for the project.

"Although it's happened in pieces, [the association] is now one of the biggest things to happen to the systems management world in years," Mason said.

The 10/Plus Association was first announced in April and began meeting in June. It is possibly the largest standards group of rival companies working together to integrate their products.

Michael O'Rourke, Tivoli's direc-

tor of technical marketing and partner relationships, summed up the association's attitude to competition: "Work together—and may the best company win."

O'Rourke said the overall goal of the partnerships was to allow companies to push their unique technologies.

O'Rourke said the membership in the 10/Plus Association was not fixed but earned. Some companies were "grandfathered" in, he said. By next April, there should only be 200 to 300 partners because "some won't make the cut," he said.

## Cabletron's CyberSwitch offers low-cost ISDN

By Michael Parsons

CABLETRON SYSTEMS INC. has launched a new family of remote-access products called CyberSwitch 100, designed for small offices and telecommuters.

CyberSwitch 100 is intended to challenge remote-access specialists, such as Ascend Communications Inc., which have typically offered more expensive products than the major network hardware vendors.

The CyberSwitch product line is an attempt by an established network player to exploit the burgeoning market for low-cost ISDN services that provide high-speed access to the Internet and to corporate intranets.

Cabletron hopes that its installation software, dubbed QuickSet, will enable nontechnical users to get

a CyberSwitch ISDN connection up and running quickly.

The software is available for both Windows 95 and Windows NT. It provides the user with a six-step process for connecting users from the CyberSwitch

external terminal adapter.

Two telephone connections enable various configurations supporting telephones, fax machines, or answering machines across the ISDN connection.

IPX routing software is available pre-configured on the unit or as a field upgrade.

According to the Gartner Group Inc., there will be more than 55 million telecommuters by the year 2000, creating an enormous demand for inexpensive and easy-to-use remote-access technology.

The switches will be made available this month, with the basic configuration price set at \$649.

Cabletron is based in Rochester, N.H., and can be contacted at (603) 332-9400 or <http://www.cabletron.com>.

**CYBERSWITCH** gives workers in remote offices, home workers, and telecommuters the chance to access e-mail and the Internet via ISDN.

to the Ethernet adapter card on their PCs.

The CyberSwitch family is available in six different configurations. It has a built-in interface that connects the ISDN connection directly into the unit without the need for an



## PRODUCT SPOTLIGHT

## EUROPEAN CONNECTIONS GET EASIER

**X**ircom Inc. and TeleAdapt Inc. are shipping travel packs that make it easier to connect to telephone lines overseas. The kits include a North American telephone cable with RJ-11 connectors and a range of overseas telephone adapters. Xircom's S129 Modem Travel Kit, pictured here, includes 12 phone adapters for connecting to phones in 160 phone systems worldwide. Xircom competitor TeleAdapt offers single adapters costing \$30 each, nine regional packs for specific parts of the world, and a \$450 WorldPak with 39 adapters. Prices for TeleAdapt's regional packs start at \$70 and vary depending on the number of adapters included. Xircom, in Thousand Oaks, Calif., is at (800) 438-4526 or <http://www.xircom.com>. TeleAdapt, in Campbell, Calif., is at (408) 370-5105 or <http://www.teleadapt.com>.



## BAY LINKS ITS REMOTE ANNEX TO WINDOWS NT

By Jeff Walsh

BAY NETWORKS INC. has extended its Remote Annex line of remote-access servers to offer native support for Windows NT.

Gwyn Edwards, product marketing manager for Bay Networks, said although other companies provide "hooks" into NT, Bay Network's servers provide actual integration into the OS, including support for its domain name authorization and integration technologies.

Barry Schwab, vice president of technology for TeleScan Technologies LLC, a dial-in database service in West Bloomfield, Mich., said Remote Annex has been a "real winner" for his company.

"Most people doing remote access are also running Unix, and, if you are a pure NT house like we are, you were up the creek," Schwab said. "If [Bay Networks] hadn't come along, we would have been in trouble."

Edwards said the servers, with the Windows-based QuickConfig Annex, simplify administration and configuration tasks. Remote Annex also has embedded event-logging and creates an automatic backup database.

The Remote Annex Windows NT server is available now, priced at \$495. Quick2Config Annex will ship in October as part of the network package or separately, priced at \$99.

Bay Networks is located in Billerica, Mass., and can be reached at (617) 272-8140.



# Cheyenne's agents remedy major groupware viruses

By Jessica Davis

CHEYENNE SOFTWARE INC. has started shipping AntiVirus Agents that detect and remove viruses from major popular groupware products including Lotus Development Corp.'s Notes, Microsoft Corp.'s Exchange Server, and Novell Inc.'s GroupWise.

The agents, which work with Cheyenne's Inoculan network anti-virus products, will be available for the groupware on NetWare, Windows NT, HP-UX, IBM's AIX, Sun's flavors of Unix, and OS/2, letting users deploy the systems across heterogeneous environments.

The software is part of an application-agent strategy Cheyenne announced early this year. "We recognized that a lot of mission-critical data is residing in applications, not just directories," said Peter Harrison, marketing manager for Cheyenne security products. "Users have a need to protect that data."

Harrison offered the Microsoft Word Concept virus as an example. The virus is written in the macro language of the application and, according to Harrison, is in 90 percent of all companies.

As documents and e-mail become more of a storage place for mission-critical information, that data needs protection. Cheyenne's AntiVirus Agents for groupware scan the system at the administrator's request or can be automated to scan changed messages or all messages at a particular time of day.

The AntiVirus Agents will be priced at \$695 each. The agent for Lotus Notes will be available this month on Windows NT, NetWare, Unix, and OS/2 platforms. The agent for Microsoft Exchange will be available on Windows NT in September, and the agent for Novell's GroupWise will be available on NetWare in October.

Cheyenne, in Roslyn Heights, N.Y., can be reached at (800) 243-9462 or <http://www.cheyenne.com>.

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## CISCO TO PURCHASE TOKEN RING VENDOR NASHOBA NETWORKS

CISCO SYSTEMS INC. last week announced an agreement to acquire Nashoba Networks Inc., a developer of turnkey networking services to LAN, WAN, and internetworking vendors. The deal is expected to boost Cisco's position in the Token Ring switching arena market, adding a workgroup and backbone switch that integrates with existing switch and router products. Nashoba Concord, the industry's first Token Ring packet switch, will become the Catalyst 1800 and provide access to high-speed servers.

The backbone switch will also be a part of a group of desktop and workgroup switches, including the Catalyst 2600, and the switches will be a front end to Cisco's routers, company officials said.

"Nashoba is one of the market leaders for Token switches, and this acquisition allows Cisco to have a Token Ring switch in the workgroup space," said Trudy Barker, an analyst with Dataquest Inc., in San Jose, Calif.

"Cisco bought its way into the switching market, and they've become one of the market leaders," Barker said. "This rounds out their product offering."

Under the agreement of the stock swap, shares of Cisco common stock worth approximately \$100 million will be exchanged for all outstanding shares and options of Nashoba. The transaction is expected to be completed by mid-September, officials said.

Cisco, in San Jose, Calif., can be reached at (800) 353-6387 or <http://www.cisco.com/>. Nashoba is based in Littleton, Mass., and can be contacted at (508) 486-3200 or <http://www.nashoba.com>.

— Pardhu Vadlamudi



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- Phantom of the Console ..... N/4
- LAN Talk, by Paul Merenbloom ..... N/8

#### HOW WE REVIEW

Product Reviews examine new products, focusing on their usability, features, and suitability to task. Our expert reviewers rate shipping products on a scale of cold to hot. The authors do not employ the extensive analyses used in Product Comparisons, so their conclusions may be different.

#### TALK BACK

Questions, comments, reviews? Send a message to the reviewers editor at dan\_sommer@infoworld.com. Please include "Talk Back" on the subject line.

## Network recovery and backup software

# Disaster recovery 'Stacs' up with Replica for NetWare

■ Software runs faster than competing backup tools but is limited to NetWare

By Jim Huggans and Ed Tittel

EVERY ADMINISTRATOR needs a tool like Stac Inc.'s Replica for NetWare 2.1. More than just network backup software, Replica makes recovering from a disaster — which Stac defines as the complete loss of a server and its contents — fast and easy. To recover your DOS partition and NetWare SYS volume, all you need are the floppies that you created with Replica and a recent backup tape. No more looking for DOS disks, NetWare disks and CD-ROMs, and tape backup software. Although we did discover a few quirks, overall we found Replica to be quite reliable.

Stac's approach to backup is to replicate selected sectors at the volume level using what the company calls object technology, rather than backing up file by file. This lets Replica back up dismounted volumes, open files, locked files, deleted files, DOS partitions, and normally mounted NetWare volumes.

For situations in which speed is crucial, we noted that Replica ran 80 percent to 100 percent faster than such file-by-file software as Chenyenne Software Inc.'s ARCserve and Seagate Software Inc.'s Backup Exec. (Stac says Replica runs two and a half times faster than these competitors on very fast equipment.) The optional Replica Multi-Server Agent (which costs \$595 for a five-server license) backs up multiple NetWare file servers across a network.

Replica comes on two floppy disks and installs easily. It does require the latest ASPITRAN (Ad-

vanced SCSI Peripheral Interface Transport) drivers for your system. We strongly recommend that you create disks for restoring a backup onto a blank hard drive, in case the drive goes completely belly up.

The product's Windows interface was simple and easy to understand,

time it would take to complete a backup were overly optimistic. But otherwise, the program did a good job of reporting on its own behavior.

Replica offers several options for backing up volumes. You can large volume dismount the volume before replicating it, which pro-

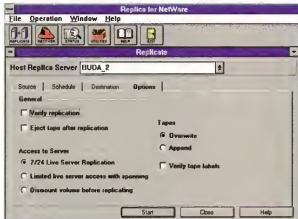
its buffers fill completely. Replica suspends further write access to the volume until it completes the job. As with dismounting, you can back up large volumes by spanning tapes.

Finally, the 7/24 Live Server option allows users to continue to write to files during a backup. Because of the tracking procedure Replica uses, volumes backed up with the 7/24 option cannot span tapes. Hence volumes that require multiple tapes to back up can't use this option.

Once Replica is installed, you can initiate backups at the server using just one of the program's 15 system console commands.

The server does not provide complete status information about backup activity, but it does display partial information, such as the number of bytes dumped. Even so, you can walk up to a server, insert a tape, type "Replica server," and your backup will be under way without further ado.

When recovering from a total server crash, Replica's speed is a big advantage; it drastically cuts the time it takes to set up and load the software. Savvy administrators may want to consider protecting their NetWare SYS volumes with Replica and using other software to back up data volumes for that very reason. This speed advantage also makes Replica attractive for servers with large amounts of data — it can deliver full backups in the time it takes other products to perform in-



REPLICA'S REPLICATE OPERATION gives you three options for backup scenarios under different operating conditions: 7/24 Live Server Replication, limited live server access, and dismount volume.

with usable defaults. It forces few decisions on the installer. From the Windows screen, we just clicked on the icon for the volume(s) or server we wanted to back up, decided if we wanted to back up deleted files, and clicked on the Start button. Replica also includes an easy-to-use scheduling tool.

Because Replica dumps volumes, it does not support selective backup, whether by file or directory, archive bit status, or any of the other options that normal file-by-file backup systems offer. Replica is strictly a volume-at-a-time tool.

You may still recover individual files or directories, though. We did so by mounting the backup set as a NetWare volume. End-users could then use their file system utilities to access files from that volume. This gives administrators the capability to mount a tape, and then it allows end-users to recover their own files.

The user interface is simple and straightforward. When opening Replica, you must log on to the network using a Novell Directory Services (NDS)-capable client if you're attaching to a NetWare 4.1 server that uses NDS. (We tried the NETX shell and were stymied until we figured this out.)

In addition, we noticed that some of Replica's estimates of how much

himits all access to files but allows Replica to back up large volumes by spanning tapes. Replica remounts the volume when it's finished with the replication.

Alternatively, you can stipulate limited live access (which translates into total read access and some write access), by which Replica buffers writes to the volume. When

## Network measurement software

# Chariot stresses your network to expose bottlenecks

By Douglas A. Zelinka

IF YOU'RE A performance fanatic like me, you'll want to take a look at Ganymede Software Inc.'s Chariot, which measures the performance of network devices. Unlike many network monitoring products that passively monitor network traffic to identify performance problems, Chariot uses real machines and protocol stacks to create the active traffic you know is causing a problem.

Chariot is ideal for administrators of large corporate networks who want to tune and regression-test their networks after performing maintenance changes.

On the surface, Chariot's price may appear cost-prohibitive. But when you consider the cost of specialized hardware traffic generators and software traffic-modeling products, Chariot can pay for itself very quickly. In addition, Version 1.1 is complementary to passive monitoring tools (such as RMON) and third-party benchmarks.

Version 1.1 is the company's first installment in a planned suite of network optimization tools to later include monitoring and tuning pieces.

Chariot includes endpoint agents, which you need to install on each machine used in a test scenario.

The endpoint for Windows 95 is minimized on the Taskbar, whereas the OS/2 endpoint is a detached process and doesn't appear in the Windows List.

For Windows NT, the endpoint runs as a service so you can monitor the endpoint itself with NT's Performance Monitor. The general intent is to install the endpoint and forget it.

I installed Chariot endpoints on a variety of machines ranging from a 33-MHz 486-based desktop PC running OS/2 Warp Connect to a 166-MHz Pentium-based dual-CPU server running Windows NT. ■ CHARIOT page N/2

#### THE BOTTOM LINE

#### Replica for NetWare 2.1

Replica capably and swiftly backs up NetWare servers, but its real forte lies in the speed with which it lets you recover from complete server crashes.

**Pros:** Easy to use; faster than conventional backup software; recovers entire systems, including DOS partitions, with two to three floppy disks and a tape.

**Cons:** Limited to NetWare.

**Stac Inc., San Diego:** (800) 522-7822, (619) 794-4300; fax: (619) 794-3371; info@stac.com; http://www.stac.com.

**Price:** \$995 per server (list); \$740 (estimated street).

**Platforms:** NetWare 3.x and 4.1.

► Switching hub

# Modular Netelligent 5000 meets growing LAN needs

By Andy Nelson

**T**HE NETINTELLIGENT 5000 is a good solution if your network is suffering growing pains and you're in the market for a 10/100 switching hub. Although the hub is a bit pricey, the real benefit of the Netelligent 5000 is its modularity, allowing the unit to expand as your network grows. The product primarily serves as a segment switch with the option of uplinking to a Fast Ethernet backbone.

The Netelligent 5000 base unit includes a rack-mountable black box with 13 empty bays, which you can easily upgrade to 12 switched 10Base-T Ethernet ports and one 100Base-TX Fast Ethernet or FDDI uplink port. Twelve of the bays accommodate hot-swappable modules that you secure using thumb screws. Each

module supports RJ-45, AUI, FDDI, or BNC connections, and you can switch between Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X) via jumpers, eliminating the need to think about straight-through or



**THE NETINTELLIGENT 5000** serves as a segment switch with the capability to uplink to a Fast Ethernet backbone.

crossover cables.

Although easy to configure, the module has to be removed from the switch to access the jumpers for selecting either a crossed port or straight-through connection. Although removing the module is a

minor inconvenience, it's an inconvenience just the same. In contrast, the Fast Ethernet uplink port has a recessed switch on the front panel for changing between MDI and MDI-X. For those concerned with fault tolerance, you can add a second power supply to the Netelligent 5000.

The front panel sports a 16-character display that shows the switch's status at all times. During a boot, for example, the display kept me informed at each stage of the Netelligent boot process.

To get the switch running, I installed the BIOS software using a Trivial File Transfer Protocol server running on my Windows NT server; you can also do this using the built-in console port or Bootstrap Protocol. This drawback is easily outweighed by the capability to upgrade the FlashPROM.

I also had to assign an IP address to the Netelligent before it could be in normal operations.

With Telnet, SNMP, and serial connection support, the switch can easily manage using a wide variety of software packages, such as Hewlett-Packard's OpenView, either directly or across the network. However, using any terminal-emulation software is a chore, requiring you to use both uppercase and lowercase characters to execute commands. This aside, the command set is concise and easy to use.

The Netelligent 5000 doesn't include an RMON agent. However, all of the unit's ports can support a third-party RMON box or probe, giving you online manageability.

The switch supports more than 8,000 Media Access Control addresses. In addition, the unit can dynamically allocate memory. Currently, it doesn't support virtual LANs.

## THE BOTTOM LINE

### Netelligent 5000

**D**esigned with network segmentation in mind, the Netelligent 5000 gives administrators the ability to expand their network as needed.

**Pros:** Modular components easy to install; ensure degree of fault tolerance; good selection of varying modules; upgradeable; common management support; upgradeable FlashPROM.

**Cons:** Switch MDI and MDI-X on modules via internal jumpers; command-line-style console commands.

**Compaq Computer Corp., Irving, Texas:**  
(800) 544-5255, (214) 929-1700; fax: (214) 929-1720; <http://www.compaq.com>

**Price:** \$45 for base unit; \$55 to \$95 for expansion modules; \$1,195 to \$1,595 for uplink module; \$259 for power supply (all average street).

Andy Nelson is a product analyst at the InfoWorld Test Center. You can reach him at [andy\\_nelson@infoworld.com](mailto:andy_nelson@infoworld.com).

# Chariot

Continued from page N1

## 3.51 Server.

Using the Chariot console, I added endpoint pairs that simply defined the protocol and IP addresses of my test machines. Next, I selected a pre-built Chariot script that simulated a file transfer with 1MB of data sent 100 times.

Chariot includes scripts for 11 different communications scenarios, including inquiry, certificate, and database transactions. (Ganymede will provide additional scripts in Version 2.0.) If you have a complex application behavior you want to reproduce, the company will build custom scripts to duplicate your application's network characteristics.

The product really stresses the components you place in its path. And the average bandwidth results in Chariot's reports don't include packet header information; it's strictly user data.

On a clean 10Mbps Ethernet network, I completely saturated the pipe between the two Pentium machines. With simultaneous file transfers from each machine to the other, bandwidth utilization peaked at 9.939Mbps. Thankfully, Chariot supports Domain Name System so you don't have to enter static IP addresses at the console. Unlike products such as Hewlett-Packard's OpenView that graphi-

## THE BOTTOM LINE

### Chariot 1.1

**F**or administrators responsible for evaluating products and performing network regression tests, Chariot makes the job that much easier by providing detailed performance metrics for almost any network device.

**Pros:** Consistent, repeatable results; use native protocol stacks; capability to regression-test network changes; detailed performance metrics precisely identify hardware characteristics and deduce router and switch performance.

**Cons:** Currently supports only TCP/IP (System Network Architecture on OS/2 only); no integration with network management software.

**Ganymede Software Inc., Research Triangle Park, N.C.:** (888) 426-9633, (919) 558-1138; fax: (919) 558-1130; <http://www.ganymedesoftware.com>.

**Price:** Console: \$9,000 for 10 concurrent connections; \$12,000 for 50 concurrent connections; \$19,000 for 500 concurrent connections. Endpoint: \$2,000 for OS/2, Windows 95, and Windows 3.1; \$3,000 for Windows NT; \$4,000 for HP-UX, Sun Solaris, and IBM's AIX.

**Platforms:** Console: OS/2, Endpoints: OS/2, Windows 95, Windows NT, Windows 3.1, HP-UX, Sun Solaris, AIX.

cally display a network down to individual nodes, you can't drill down to Chariot endpoints; you must

know the host name or address of every machine you want to use.

Interestingly, Chariot also exposed vendor TCP/IP stack limitations. I tested two identical 90-MHz Pentium machines running Windows NT and OS/2 Warp, a 66-MHz 486 PC running Windows 95, and a 33-MHz 486 PC running OS/2 Warp. The 486/33 with an Eagle NE2000+3 Ethernet adapter yielded faster file transfer rates than Windows NT did on the Compaq Deskpro XL P90 with a PCI Net-Flex-2 network interface card.

According to Ganymede, OS/2 has the fastest TCP/IP stack; the company has tested, handling in excess of 200 connections on a machine with more than 24MB of RAM.

In my testing, I noticed that Windows 95's TCP/IP stack became unstable under heavy loads, while Windows NT's TCP/IP stack remained solid through hours of stress testing. OS/2 Warp's TCP/IP provided consistently high throughput. Both the NT and OS/2 stacks could go down handling heavy traffic from lots of connections.

According to Ganymede, every TCP/IP stack will break down if you stress it long and hard enough with varying connection patterns.

Chariot generates reports with minimum, maximum, and average statistics for throughput, transaction rate, and response time. You can view the results at the console in tabular text format, or export the results to spreadsheet or HTML formats. Tabular results actually look better using Netscape Navigator than in Excel or Lotus 1-2-3. Therefore, network hardware vendors may find that posting results in HTML to a Web page is a more convenient way to communicate detailed technical information.

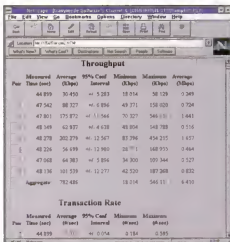
Because Chariot endpoints reside only on actual machines, you can't directly test the maximum effective

throughput of routers or switches, except by testing selected machines alone on an isolated network, and then across your router of choice. Ganymede could eliminate this limitation by tightly integrating Chariot with third-party network management products.

Version 2.0, due later this fall, will add support for randomly testing variables, transferring specific data types (such as compressed binary or ASCII), and graphing results as well as NetWare Loadable Module and MVS endpoints. The monitoring piece is slated for 1997. And, eventually, a tuning capability will add links to third-party network management packages such as HP OpenView, Sun NetManager, and IBM NetView.

Depending on the level of third-party integration, Chariot may even probe your network for performance or stability weaknesses and optionally make changes to the configuration file for you or recommend locations for additional routers.

Douglas A. Zelinka is a software engineer and Certified OS/2 Engineer. He has worked with OS/2 since 1991. His Internet address is [74662.1557@compuserve.com](mailto:74662.1557@compuserve.com).



**WHEN A TEST IS COMPLETE**, you can view detailed results at the console, copy them to a text file, or export them to spreadsheet or HTML formats (as shown here).

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**Vycor Enterprise Desktop View**

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**Problem Management**

Gene Wright  
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Can't print document.

**Problem Resolution**

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**Problem Prevention**

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Message: Sales printer is down.  
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Web Interface	Yes	Yes
Problem Prevention	Yes	No
Service Level Agreement	Yes	No
Inventory Management	Yes	No
Desktop Configuration Management	Yes	No
Software Distribution	Yes	No

\*As reported by former Remedy customers.

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Circle 10 on Reader Service



► NetWare task automation software

# Phantom of the Console's utility masked by performance problems

By Mike Avery

**P**HANTOM of the Console is an attractive-looking package that offers task scheduling for NetWare file servers and the capability to off-load tasks to idle PCs as well as handle exceptional conditions on NetWare servers. Unfortunately, Citadel Computer Corp.'s product hasn't fully materialized. I experienced problems with both my server and the client console. Therefore, I recommend waiting until the next version, when the company has had the chance to exorcise the product's demons.

Both Podell Systems Inc.'s Console Manager for NetWare 2.0 and Avanti Technology Inc.'s TaskMaster 1.5 are more reliable and easier to use than Phantom of the Console. However, neither Console Manager nor TaskMaster offers the capability to execute programs on idle PCs. (See reviews of Console Manager and TaskMaster, April 29, page N/2, and June 10, page N/2, respectively.)

The Phantom of the Console has four NetWare Loadable Modules (NLMs) for scheduling and task invocation, starting tasks on idle PCs, handling ProActive tasks, and adding commands to the NetWare server console. It has its sample job scripts load and unload PXCONSLE.NLM as needed. However, most experienced system managers are reluctant to load and unload NLMs unless it's absolutely necessary.

On one occasion, I experienced an Abend within the PXCONSLE.NLM program. I wasn't able to determine the cause of the problem (even with help from the company), and it didn't recur; but it gave me serious reservations about the product's stability. In addition to loading the WSEVEN.NLM on my server so idle PCs could execute commands, I had to load the PWAEXEC command on the intended PC and give it a unique name. At first, the PWAEXEC program seemed to cause instability with the systems I was using. My ancient but bullet-proof 386/DX40-based machine would lock up approximately 30 minutes after I loaded PWAEXEC.

The company suggested that I tell PWAEXEC to use a named disk file as task-swap space. This solved the problem and let me pass commands to the idle PC. It was spooky watching the machine do things for me.

## Taken to task

The only drawback to the task distribution software is that it doesn't

allow for wild-card selection of an idle PC. I would rather write scripts so that the first idle PC found would run the task.

You can write a task that will poll the available PCs by name and use the first idle one it finds, but you will have to set up the code explicitly and change it as you make new

The DOS console uses the reversed (or reviewed) SeWorthy interface. Although many administrators don't like this interface, I do; it's easy to navigate, fast, and intuitive.

The product does a commendable job of ensuring that only authorized people use the system. To use the consoles, I had to be a

major, another set of the commands was added to be the buffer.

Using the editor, I could export the commands I wanted executed to a text file or import previously exported files. However, the product seemed to treat saving and loading command files as an unusual activity. To read a file, for example, I deleted the three or four standard command lines and then imported the file. Once I made changes to the command list, I saved the changed file. The export command, though, didn't remember the name of the imported file.

Re-entering the file name was a minor but real inconvenience. Worse, Phantom doesn't offer a simple way to schedule a saved text file. You have to import the text file first and fill out all the other fields.

The Windows-based console exhibited some odd glitches. For example, in one instance the console didn't like an entry on the trigger text line when I was trying to set up a ProActive task. The console flagged a line of text as having an invalid value but would neither tell me what was wrong with the text nor let me change it (see screen shot).

In the end, I canceled the attempt to create the alert and began entering data anew. A few attempts later, Phantom accepted the same data it had been rejecting up until that point.

Although the DOS console

worked more smoothly, it wasn't without warrants. When I attempted to save the commands to have a ProActive task remove drive automatically, the DOS console reported that it couldn't write to the output file.

In contrast, although Avanti's TaskMaster DOS console has a dated look, it works very well. Both the Windows- and DOS-based Phantom consoles left me confused, wondering what I should do next, and then not quite delivering the results I expected.

## Documentation debacle

The manual looked fresh off a laser printer — 51 pages long and held together with a single staple. In addition, there was an online addendum in Microsoft Word format and an online README file.

Given the level of documentation, I didn't understand why an addendum and README file were needed; this information could have been easily included in the manual. None of the documents contained an index or table of contents. Several times the manual referred me to Chapter 4, but there were no chapter headings.

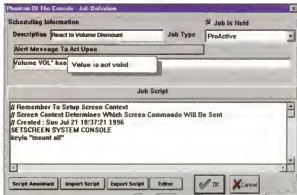
Most of the examples in the manual didn't work correctly when I first tried them, usually due to oversights and typos. For example, items left out of the examples included keywords and directions to send the <enter> command to the system to run the scheduled commands. I expect examples provided in documentation to work. In addition, it's nice when the examples are available on the program disk, saving typing time.

The manual was also inconsistent in explaining the differences between the various editions of Phantom of the Console. According to the manual, Citadel offers three different versions of the product — Basic, Gold, and Platinum, each including varying features and functionality.

However, the disk I received wasn't labeled with the version name, so I had difficulty determining what I should reasonably expect from the product.

According to Citadel, the documentation is currently being rewritten.

Mike Avery is a networking consultant based in Beaumont, Texas, who has designed and supported networks of all sizes. He can be reached at mavery@pernet.net.



THE WINDOWS-BASED CONSOLE displayed some odd quirks. For example, it didn't explain the problem with this line of text in a ProActive script and wouldn't let me fix it. Finally, it lost the work.

PCs available for tasking. What is worse, you'll have to make these changes in every script file that uses idle PCs. NETInc.'s NetMenu offers much better task sharing through its DOS menu system.

Although installing Phantom of the Console went smoothly, the process was not without some problems. For example, the documentation states that I should have certain release levels of specific NLMs on my server. However, the installation program didn't seem to check the NLMs to ensure that they were at the correct levels.

Unlike many programs that run as NLMs, Phantom did not offer to modify my server's AUTOEXEC.NCF file to add the necessary commands for starting the program. The installation program created a subdirectory called Phantom on the server's SYS volume and also put a number of files into the System directory. I would have much preferred having all the files put into a single directory other than the System directory.

Phantom provides two consoles, both of which let me create, modify, reschedule, delete, add, and save tasks. I also could prepare reports of scheduled tasks.

The Windows-based console has a very attractive graphical interface. However, my usually stable Windows 95 machine locked up frequently while running Phantom.

member of the Phantom users group and enter a password when I started either the DOS or Windows consoles.

## Event driven

To schedule a task from the console, I went to the Job Definition screen and entered a description of the task and the job type (one-time, hourly, daily, weekly, monthly, annually, or ProActive).

Phantom starts ProActive tasks in response to a server event rather than at designated times. It recognizes these events by the appearance of selected text on the server's screen.

For example, I had Phantom purge deleted files from the server when it ran low on disk space. Then I entered the time of the next scheduled task execution or the trigger text for a ProActive task. In addition, I could enter any days of the week on which I didn't want the task to run.

Finally I entered the commands I wanted Phantom to execute through a simple text editor. To ensure that some commands get executed at the start of each task, the console program automatically enters a number of lines into the text buffer, which quickly becomes a nuisance. For example, when I wanted to reschedule a saved job, it already contained those commands. So each time Phantom ran

## THE BOTTOM LINE Phantom of the Console

**T**he system scheduling and management tools make this a promising product, but it's marred by poor documentation and performance. Unless you're an adventurous administrator who wants to conquer the uncooperative LAN, wait until the next version.

**Pros:** Wide range of scheduling options, including the capability to off-load tasks to idle PCs and generate reports of scheduled tasks.

**Cons:** Documentation mostly unusable and problematic; severe stability problems.

**Citadel Computer Corp., Houston:** (800) 602-0701, (713) 686-6400; fax: (713) 686-6495; <http://www.citadel.com>.

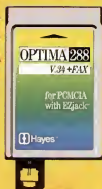
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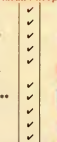
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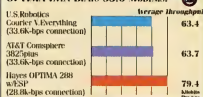
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LAN TALK • PAUL MERENBLOOM

# Laptop and desktop users need a plan for useful backups

EVERY ONCE IN A WHILE reality catches up to those of us in network land. Take, for example, a recent experience in which an *InfoWorld* editor sent an e-mail asking for some information for her Rolodex (electronic, of course), which had been lost with a machine wipeout.

No big deal, right? All that's required is a bit

of rekeying. Yet the real question is: Why didn't she have backups? Oh, it was just a laptop. But why not back up the laptops, along with the desktops, for that matter?

Though I'm not in the *InfoWorld* office, I, too, must admit that our backups usually don't include laptops or desktops — just the



networked stuff. So, how does one address the problem of traveling users?

One option (not my favorite) is to have users dump all of their data to the LAN for backup. That

would work, and the folks at Seagate would probably love us forever for having to buy the hundreds of gigabytes of online, or near-line, storage.

Another option is to use the backup utility and drag the user's disk contents to a DAT or magneto-optical drive. That's technically viable and pretty easy to do, but it's not the type of activity I'd suggest for your typical Ethernet or Token Ring network.

You could install a SCSI adapter and move a tape or magneto-optical drive from site to site. This is a bit cumbersome, but you're unlikely to trash network performance with megabyte-size packet blasts, nor do you have to leave machines connected to a network overnight, logged in, with "security bypass opportunity" flashing on the screen saver.

Finally, you could create backup stations, or even networks, using dedicated docking stations and isolated from the general users' traffic.

I've come to the conclusion that there is no best answer. Clearly, keeping network traffic under control is a great reason to shoot down several of these options. The portable tape-drive approach works quite well, but it does raise some questions about software licensing for the backup utilities.

For high-capacity archival, I vote for the stand-alone network or dedicated docking station approach. Installing and deinstalling the backup code is a pain. (But it's still cheaper than buying the backup software for each machine, because the code will be dormant 99 percent of the time.) And the SCSI-2 throughput and DAT capacity are worth it.

For incremental maintenance there is another option. Seattle-based XactLabs Corp. is now offering, both directly and via several national providers, a service that will enable you to have the desktop or laptop "dialed" in to XactLabs' system and dump contents in compressed and encrypted format to its data farm for storage and round-the-clock retrieval. XactLabs (<http://www.xactlabs.com>) or (206) 654-5300 is just rolling out the service.

My favorite approach, however, comes from Iomega Corp. Since you last saw the big, bulky Bernoulli removable platters, the speed's gone up, the size is down, and the price is just amazing. Priced at about \$200 at your local Circuit City or Computer City, Iomega's Zip drive has earned its way into my laptop bag. With removable 100MB platters (priced at less than \$20 each) and a parallel port interface, the only downside to this unit is the weight of the power transformer. As a desktop solution the Zip is just perfect. I have one on my docking station, and what a joy it is.

The platters are sturdy and easily survive a Federal Express trip home. And, at 100MB per disk, exchanging data such as presentations, multimedia files, and databases is a snap.

Paul Merenbloom is vice president, technology research at Piper Jaffray, in Minneapolis. You can reach him at [pmeren@mcimail.com](mailto:pmeren@mcimail.com).

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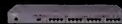
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# Fighting against the spam and getting the worms back into the opened can

**T**alk about opening a can of worms. I had no idea what I was getting into when I started writing about junk e-mail. It's often the case with the Gripe Line that I only learn the full extent of a problem after I write about it. What's unusual about junk e-mail is that I've already written about it several times,

and yet every day brings in more responses telling me about how new sets of problems I hadn't heard about before.

It also presents a whole new set of journalistic issues about how I should report what I'm hearing. A number of readers, for example, felt that I gave the Junk e-mailer who calls himself the "Spam King" too much publicity by giving him a chance to tell his side of the story.

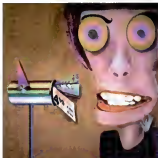
"I'm concerned that you are giving unsolicited junk e-mail in general [and this person] in particular an air of legitimacy they neither warrant nor deserve," wrote one reader. "The issue is quite simply this: Junk e-mail advertising does not defray costs; it increases them. If TV advertising had the same effect, there would be no TV advertising. ... It's like sending junk mail postage due."

I understand the point, but I'm not entirely sure what to do about it. Whenever I identify a company that's being gripped about, even if I personally feel just crawled out from under a rock, I have to give them the chance to argue their side of things. The only alternative for me is to not name the company involved, and maybe that's what I should have done in this case. Junk e-mailers are usually going to welcome even the most negative publicity, and it's not like a regular gripe situation where you can register your displeasure with the vendors by not buying their products. So keeping them anonymous may be the best thing.

And on the subject of registering your displeasure, another issue readers have frequently raised is how difficult it is to get the please-don't-mail-me-anyone message through to the junk e-mailers.

"It would be nice if you could [send e-mail to] someone to get off their spam list, but many of the spams are designed to convey small mail or phone information, because the commerce is via normal, non-electronic means," observed one reader. "So in order to avoid negative e-mail response, they include a bogus sender line."

Many readers doubted that a do-not-mail list would work.



"That isn't a solution," wrote another reader. "The problem is that you would have to single yourself out for individual, nonanonymous attention by sending your e-mail address to someone who has proved their complete lack of respect for netiquette, privacy, and even sanctity of individual self by sending you the junk mail in the first place. Even if there were one centralized master list rather than a list for each spammer, it seems like the exact opposite of a 'solution' to these anti-social troublemakers."

In that context, there were also some who thought I had lost my mind to suggest that we could build our own do-not-mail list.

"Are you really encouraging your readers to copy you with all their junk e-mail correspondence?" wrote one cynic. "Are you secretly supporting Bob Metcalfe's Internet collapse theory by causing a local one there at InfoWorld?"

No, but I may have to get InfoWorld to buy me a new backup drive. I may have underestimated how much mail you'd forward to me, but I haven't gone under yet. And it's fascinating to see the variety of junk e-mail people are receiving.

I should make it clear how I plan to use these messages. I definitely won't turn them over to any of the junk e-mailers themselves, not at least until there is some mechanism in place to make sure they actually honor the do-not-mail promise. I don't trust them to do so any more than most of you do.

What I am doing is reading and comparing the messages you forward to me to identify the worst junk e-mail practitioners, particularly in terms of those who don't respond to requests to drop your address from the list. That will give us a weapon we might be able to use against them. In fact, we can start next week by talking about a few of the most insidious cases I've seen so far. Now that the worms are out of the can, we might as well go fishing.

Ed Foster's Gripe Line examines product quality, customer service, and sales practices.

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## TO THE EDITOR

JUDGING FROM THE WEEK'S letters, there is no doubt that our readers read InfoWorld carefully and critically. One reader wrote in response to Michael Vizard's column to ask us to write more about the cost of upgrades. We also received a letter from a reader who disagreed with an article about America Online, and another agreed with Bob Metcalfe's ideas about Internet telephony fraud — but not with his solution.

### The cost of change

MICHAEL VIZARD'S July 29 column made some good points, but why did InfoWorld give up on the killer story: What does all this upgrading cost America and the world? [See From the News Desk, page 3.] It's not "an interesting exercise," it's a major economic issue that few people, and especially those in the computer industry, are willing to address. These "soft" costs are clearly in the billions of dollars. I'm sure the folks at Gartner, Meta, and Forrester, as well as some of the ivory-tower types, would have some pithy quotes. And how about Metcalfe (winner of the best bucket of cold water/refreshing award) and Foster comments?

I know InfoWorld is "The Voice of Client/Server in the Enterprise," but sometimes it should step back and take a macro view of what this industry is doing to the economy as well as for the economy. From a purely selfish viewpoint, I think it would put InfoWorld at the center of what should be a national debate on the value and importance of this constant change. The letter to the editor from T.A. Jakubowski illustrates that some IT managers know upgrading to the cutting edge is not always the right decision. [See To the Editor, July 29, page 58.]

How about an article on wasted billions? Just because these are "soft" costs does not make them any less expensive to the United States.

Mark Pruner  
Greenwich, Conn.  
[mark@webcounsel.com](mailto:mark@webcounsel.com)

### Maximizing Web advantages

I COULDN'T AGREE MORE with Stewart Alsop's column "Confessions of a Web addict: Let me do real business at your Web site." [See

Disrupted Thinking, August 19, page 98.]

My view of the World Wide Web is that it is an extremely efficient way to distribute and collect information, and that developers who keep this in mind create the most useful sites. Alsop takes that to its logical extension by giving the examples of putting his newspaper subscriptions on hold, or checking the status of accounts at his local public utilities.

If developers would keep this in mind, we would have fewer sites that waste bandwidth with unnecessary graphics and marketing gimmicks that look old the day after they are put up. Those looking to take advantage of the Web should look for one of the following:

- A situation where important information is already being distributed, but could be handled more efficiently through the Web, such as putting product information online; or
- A situation where the efficiencies of the

I KNOW INFOWORLD IS  
'THE VOICE OF CLIENT/  
SERVER IN THE ENTER-  
PRISE,' BUT SOMETIMES  
IT SHOULD STEP BACK  
AND TAKE A MACRO  
VIEW OF WHAT THIS  
INDUSTRY IS DOING TO  
THE ECONOMY AS WELL  
AS FOR THE ECONOMY.

Mark Pruner  
Greenwich, Conn.

Web can create a profitable niche to lower the cost of distributing new information on the Web, such as NetCentric's fax distribution system.

If those eyeing the Web as an opportunity keep these situations in mind, the right kind of new applications will be developed, and junk applications won't be developed in the first place.

Bill Dorsey  
San Diego  
[billdorsey@usedcomputer.com](mailto:billdorsey@usedcomputer.com)

## QUICKPOLL

### Moving to NT 4.0?

Windows NT has clearly changed NetWare for the file and print market, and Microsoft Corp. is looking for more market share with next month's release of NT 4.0. Do you plan to move to Windows NT 4.0 during the next 12 months? (Respond by Aug. 16.)

To register your opinion, call (800) 713-INFO or visit <http://www.infoworld.com>.

### Re: Data warehousing

The availability of tools is helping data warehousing evolve from being simply a buzzword. In our July 29 issue (page 58), we asked: Do you plan to implement a form of data warehousing in the next year?



### No victory for AOL users

IN A JULY 15 ARTICLE, InfoWorld characterized the settlement of 11 class-action lawsuits against America Online as a "landmark victory" for Internet service customers. [See "Settlement will give AOL users free online time," page 60.] Nothing could be further from the truth.

The settlement gives AOL customers only 1 hour per \$300 of online time that AOL customers used during a four-year period. AOL customers were overbilled without notice by AOL by least 5 to 16 cents for virtually every online session in that time period.

For most users, those nickels and dimes quickly add up to more than \$2.95, the current price of an hour of time on AOL. Further, the settlement does not reward thousands of AOL "remote staffers" who are paid for working online with free AOL time, nor thousands of online contest winners who were given free time. That free time was lost



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is tight.  
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But it  
also  
sounds  
pretty  
darn  
expen-  
sive.

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IBM presents the first affordable 25Mbps ATM Workgroup Solution. Everyone is talking about ATM as the answer for speeding up busy networks. But there are two good reasons why business hasn't stampeded en masse to the ATM solution: It costs a lot. And to get there, you have to rip out everything you have.

Well, with all respect to the status quo, IBM now unveils the new 25Mbps ATM Workgroup Solution. It comes complete with workstation adapters, giving you an immediate boost in bandwidth, with plenty of room to grow in the future. And it all comes at the refreshingly low price of \$495 per connection.



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# ATM: Unfulfilled promise

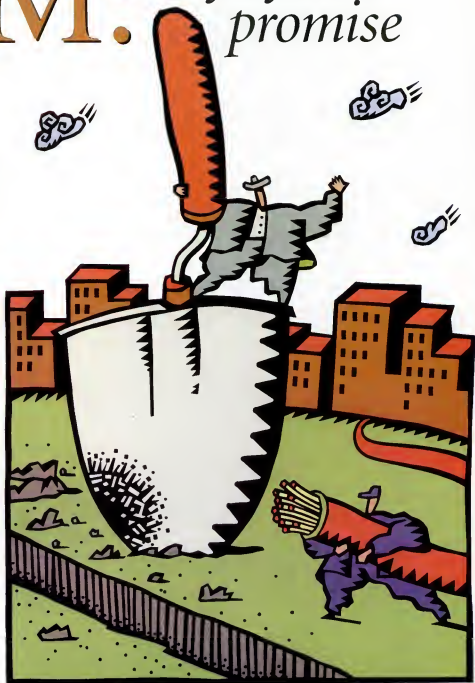
By Steve Alexander

synchronous Transfer Mode (ATM) technology has yet to find its way into more than a fraction of client/server systems, and questions remain about whether it will become more practical on the desktop. Businesses that have already adopted ATM have done so either because switched or Fast Ethernet was not readily available, or because they believe ATM will eventually fulfill its promise of delivering both voice and data over the same high-speed network.

ATM offers benefits in client/server, particularly if you either have very large bandwidth needs or are buying a technology based on anticipated needs. It can be used to replace common LAN technologies, such as 10Mb Ethernet, and is an alternative to Fast Ethernet or switched LANs.

Although there are a growing number of ATM installations — desktops connected by switched Ethernet to an ATM backbone — ATM to the desktop is rare. Its adoption continues to be held back by its higher price, the

**No longer the high-speed king of the hill, ATM to the desktop requires faith in its long-term promise**



lack of need for huge bandwidths, and, to some degree, its unresolved technical problems.

Paul Strauss, senior analyst at Sentry Market Research, in Westboro, Mass., says that, although ATM use is growing, the jury is out on ATM for client/server applications.

"Within the next 18 months I think we will know to what extent we need 155Mbps or 25Mbps ATM. The sit-

uation now is that ATM is facing stiff competition from switched LANs and new high-speed 100Mbps Ethernet, both of which are very inexpensive," Strauss says.

**HOW MUCH MORE?** Exactly how much more expensive ATM is depends on whom you ask, but no one debates that it is more costly than competing technologies. Both

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InfoWorld May 20, 1996



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Windows NT Magazine, May 1996



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InfoWorld May 20, 1996

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3Com Corp. and Mier Communications Inc., a consultancy based in Princeton Junction, N.J., say ATM to the desktop is about five times the cost of Fast Ethernet.

CIMI Corp., a consultancy in Voorhees, N.J., says the price differences of installing desktop ATM vs. Ethernet are actually minimal. It costs \$500 per seat for ATM, \$350 to \$400 per seat for switched 10Mb Ethernet, and \$220 per seat for shared 10Mb Ethernet. But CIMI notes that ATM has hidden costs. "There is more to ATM than the cost of the media," says Tom Nolle, CIMI's president. "To write an ATM application is almost impossible, because no toolsets or APIs are available. With ATM, you're asking users to invest against the expectation that applications will exist in the future."

Other analysts say high-speed switching needs raise desktop ATM prices above the relatively low per-seat numbers that are often quoted.

The need for ATM bandwidth seems to be limited to a handful of killer applications, such as brokerage houses that perform high-speed analyses and hospitals that transmit X-ray images.

**NOT READY YET.** Unresolved technical issues include simultaneous voice and data transmission via ATM, which nearly everyone agrees is not yet ready for prime time.

Tim Hale, ATM program manager at Cabletron Systems Inc., in Rochester, N.H., says there are only limited implementations of simultaneous desktop voice and data.

"The full promise of voice and video to the desktop really isn't there yet. It's there in a conference room sort of capability today," Hale says.

The ATM standards for simultaneous voice and data are nailed down, but implementation is a problem, Hale adds.

Some see little movement toward using ATM for client-server applications.

"There actually is no clear trend in taking ATM to the desktop, because the commercial user population is so small you couldn't even get statistical significance out of it," Nolle says.

"It will be the end of 1997 before there is enough ATM to the desktop to make any definitive comment on it," Nolle adds.

## VIRTUAL CIRCUITS ARE KEY TO ATM

**A**ynchronous Transfer Mode (ATM) technology holds out the promise of being capable of linking a wide range of devices using one seamless network. It removes the distinctions between LANs and WANs by integrating them into one network.

A virtual circuit is created between two or more points for every stream of data sent via ATM. Adapters at each end of the circuit negotiate their operating speed and other parameters for the type of data being sent; most ATM switches and adapters operate at either 25.4Mbps or 155Mbps. ATM adapters also guarantee applications that bandwidth will continue to be available.

ATM differs from other network technologies, because it is based on relatively small, fixed-length data units called "cells." The use of cells makes it easy for ATM switches to share bandwidth evenly among network users with different

**BENEFITS ABUNDANT.** Despite competition from faster, cheaper alternatives, ATM supporters insist that it continues to offer advantages over switched and Fast Ethernet.

"Where ATM shines is with real-time, high-bandwidth traffic, because only ATM can provide a dedicated path, full duplex [connection] between a client and a server," says Ed Mier, president of Mier Communications.

Every other environment is subject to transient loss, in which periodic heavy loads cause packets to be dropped, and to time delays, known as variable latency.

Others argue that only ATM offers long-term benefits, such as less expensive future network upgrades and the capability for running voice and data over the same network, that outweigh the current higher costs.

"I believe 10Mb Ethernet will have the lion's share of the desktops for the next 10 years but that we'll see a definite upswing in adoption of ATM down to the desktop over the next year or two," says George Prodan, marketing director for adapter products at Warrendale, Pa.-based Fore Systems Inc.

"Within the last four months we've seen bids for ATM to the desktop change from 10 to 15 cents, to 100 to 150 cents, and now to 1,000 to 3,000 cents," Prodan says.

Migrating directly from shared 10Mb Ethernet to ATM will be more expensive than migrating to other Ethernet technologies, but it will be less costly than migrating upward from shared Ethernet to switched Ethernet to Fast Ethernet to ATM over five years, Prodan says. And those who install ATM now will be set for the next five to 10 years.

The real business case for adopting ATM involves integrating a corporation's voice and data networks in the future, not saving money today, says Amir Eldad, marketing director for the ATM division of Santa Clara, Calif.-based 3Com.

Business managers who adopt ATM think it will last for years, and then later they'll be able to integrate voice and data networks and save on costs, Eldad says.

"The answer to what the customer needs is really given by what type of services the user is likely to integrate in the network," Eldad says. "If the network will be used for data only, and that's the only thing on the horizon,

then at the desktop level Fast Ethernet probably is the much better solution. But the answer is different if the user envisions different applications in the future, such as voice, video, and data integration, and wants to use the same technology over the LAN and WAN. If this is the case, at some point he or she needs the ATM vision."

**SOLD ON THE FUTURE.** For some users, that vision of the future is justification enough to use ATM today. But often ATM to the desktop is merely an addition to a more extensive ATM system already in the works.

"We initially went into ATM for our back-office systems, where it was server to server and not to the desktop," says Jerry Coleman, system and network manager at Newport Beach, Calif.-based Pacific Investment Management Co., a company that manages money for large institutional investors. "We have two locations, and we dug a trench and laid fiber between two buildings about an eighth of a mile apart."

"But we are planning to use Fore Systems' 25Mb ATM to the desktops of our traders who buy and sell securities," Coleman says. "We need the throughput to their Sun Sparc workstations, because we do a lot of data modeling, such as analysis of mortgages, and we've put in a big server. The shared 10Mb switched Ethernet we're running to those 20 workstations now is just not fast enough."

In addition to the desktop analysis, ATM also will make it easy to do videoconferencing between Pacific Investment's two buildings, from the traders' desktops in one facility to the conference rooms in the other.

"When we first put in ATM two years ago, Fast Ethernet was not out yet," Coleman says. "Today Fast Ethernet probably would be sufficient for our traders' needs, but we don't want to add another technology into the mix we've already got. Because we have the ATM switches already, it would be better to keep things the same and go with the ATM."

At the University of Colorado Hospital, in Denver, 155Mb ATM to the desktop is available primarily for sending X-ray and ultrasound images back and forth between eight buildings on three hospital campuses. Ultrasound previously was transmitted over 10Mb Ethernet and, for the most part, X-rays weren't transmitted at all. In addition, during the next two years the hospital will roll out an electronic medical records system that is expected to use ATM to the desktop.

The hospital's client-server application was installed as part of an enterprise-wide ATM network, and desktop use was "not too much of a driver" in the decision to buy ATM, says David Spencer, director of networks and telecommunications at the University of Colorado Hospital Authority, also in Denver.

Desktop ATM is available to about 20 workstations in the radiology and cardiology departments, and it also will serve a Kodak digital X-ray processing and archive system that will replace the use of X-ray film.

"Sending X-rays and other images back and forth is our only high-bandwidth demand. The cardiology people use desktop ATM primarily for video motion studies of how things are working in the heart," Spencer says.

"The important thing is not to choose ATM for ATM's sake," Spencer says. "We didn't analyze the technology at all. We ana-

## SPEED, WAN NEEDS DRIVE ATM USE

**L**aser Tech Color Inc., an Irving, Texas-based graphic design company, uses 155Mb Asynchronous Transfer Mode (ATM) to move large image files between a server and 14 desktop Sun Microsystems Inc. and Silicon Graphics Inc. workstations.

"Our application is imaging, so our files are extremely large," says Bill Covington, Laser Tech's technology director.

"Most of the files we run are in the neighborhood of 10MB to 650MB, with the average being around 120MB. And we move a lot of them," Covington says. "We've got 320GB of images on-line, and we generate another 15GB to 20GB of new image data every day."

ATM to the desktop also has allowed Laser Tech to change the way huge image files are worked on.

"It used to be that when you worked on a file, you had to copy the file to the local workstation, then send it back to the server. But with our implementation of ATM, we've been able to work directly off the server," Covington says.

ATM technology was chosen to replace 10Mb Ethernet on the LAN mainly due to the obvious benefit of high bandwidth. But Laser Tech's client-server ATM was put in as a result of a larger, enterprise-wide application: linking together geographically separated facilities without having to convert from Ethernet to ATM.

"The plan is to incorporate all our five locations together, and ATM will give us that seamless wide-area capability," Covington says. "We selected ATM for flexibility and then extended it to the desktop. We did it for speed, but it also gave us something we will not have to replace in a year or so."

Covington says it would have been cheaper to use Fast Ethernet to the desktop instead of ATM, but he also says that, when the company installed ATM more than a year ago, he couldn't find Fast Ethernet interfaces for all of his desktop workstations.

Laser Tech also has 25Mb ATM desktops that Covington plans to use in some existing Macintosh and PC desktop computers starting this summer.

"We're still working on getting some software applications to run on the Mac that take advantage of the 25Mb cards," Covington says.

lyzed what our business needs would be. Our RFP [Request for Proposal] said nothing about how to solve the problem technically."

That said, Spencer's sold on ATM, largely because of its perceived value in the future rather than today.

"I think it's future-proof, and it ultimately will handle voice, video, and data all on the same protocol," Spencer adds.

"The hospital's use of desktop ATM is atypical of client-server systems," Spencer says. "I just don't think the bandwidth demands are quite there yet for ATM in most client/server systems. What is driving bandwidth needs in hospitals is primarily the transmission of images and electronic medical records."

There seems to be no guarantee that ATM to the desktop, so atypical today, is destined to become the norm anytime soon.

Steve Alexander is a free-lance writer based in Eden, Minn.



15TH ANNIVERSARY

# The IBM PC, then and now



**Specifications of the original IBM PC**  
 Processor: Intel 4.77-MHz 8088 microprocessor  
 Memory: 16KB RAM standard  
 Hard drive: None  
 Keyboard: 84-key  
 Operating system: PC DOS

**Optional:** One or two 160KB floppy drives  
 RAM expandable to 64KB  
 Monochrome display and adapter  
 Color (CGA) display and adapter

**Software:** VisiCalc, EasyWriter, Adventure  
 Cost: \$4,500 for a configuration with 64KB of memory, two 160KB floppy drives, and a CGA color monitor and adapter

**Specifications of IBM's PC 300 series (introduced June 18)**

Processor: 200-MHz Pentium  
 Memory: 32MB RAM  
 Hard drive: 1.6GB  
 Cache: 512KB of Level 2  
 Operating system: Windows 95, Windows 3.1, Windows NT, DOS, or OS/2 Warp

Cost: \$3,100 for the above configuration

**F** By Bob Kayne  
 fifteen years ago this week, the IBM Personal Computer was introduced, bringing office workers a "low-cost system [that] provides computing capability in a small package." That's the understatement IBM used to announce its first PC.  
 The story has been told so many times that it seems ingrained in our collective consciousness: Twelve IBM engineers, led by the late Philip "Don" Estridge, set out to create IBM's first PC. And they did so without the normal constraints put on IBM projects. They sought out software and hardware from outside IBM. Microsoft



Corp. signed on to develop Basic and PC DOS, and Intel Corp. sold IBM the 8088-Microprocessor Development System that used the Multi Bus.

The arrival of the original PC was greeted with stronger demand than IBM could have predicted. And the IBM PC XT met with even greater success.

But this week's anniversary comes at a challenging time for IBM. Over the years, the company has found it difficult to maintain the No. 1 position while continuing to innovate. In late July, it reported second-quarter earnings of \$1.3 billion, down from \$1.7 billion in the second quarter of 1995. But sales and income were better than expected.

The PC also finds itself in an interesting juncture. The system that everyone said would empower the office worker has become a commodity item. The focus has shifted off of the PC and on to the Internet and the World Wide Web. Web browsers run on almost any system. Even Microsoft, which spent millions of dollars to promote Windows 95, has conceded that the operating system is no longer king, and it has plans to make its Web browser, the Internet Explorer, the preferred interface for its OS.

And in the era of client/server computing and distributed processing, the PC's dominance may also be challenged by the network computer (NC).

But the challengers to the PC are still just that, challengers. Browsers need PCs, and the NC has yet to deliver on its promise. As we mark the PC's anniversary this week, it is still the king of the hill.

## Major milestones in the evolution of the IBM Personal Computer



# Before you choose a monitor, consider what the experts have to say.



"Mitsubishi's DIAMONDTRON tube is no clone. It's an attempt at embracing the best aspects of the Trinitron while addressing its problems. Of all the technologies - traditional shadow mask, Trinitron, DIAMONDTRON, ViewSonic's SonicTron and the ChromaClear from NEC - Test Center Engineers were most impressed with the DIAMONDTRON."

*Computer Reseller News  
April 1, 1996*



"The image in the Diamond Pro 21TX proved excellent in almost all respects especially in color purity, focus and convergence. The Diamond Pro 21TX offers a good quality image at a fair price. Highly recommended."

*CADALYST  
February 1996*



"In our testing, the Diamond Pro 17TX proved itself the hands-down champion in image quality and text clarity."

*InfoWorld  
November 20, 1995*

"Perfect color convergence, a regular and stable image, and excellent color accuracy make the Diamond Pro 17TX a formidable monitor. The on-screen controls are intelligently designed and image geometry is maintained out to the screen's corners."



*Windows Magazine  
Summer 1996*



"For top-drawer image quality, Mitsubishi's Diamond Pro 21TX, with its DIAMONDTRON tube, is an excellent choice."

*New Media  
November 1995*



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### MANAGER'S BOARD BULLETIN

**STAYIN' ALIVE.** Client/server technology seems to stage more comebacks than John Travolta. In fact, after reviewing the results of a new study, analysts from Datapro Information Services Group believe that all companies will eventually have at least some client/server systems. Datapro's 1996 *International Client/Server Issues Survey* finds that 46 percent of the respondents have implemented client/server applications — a 25 percent increase compared with 1995. The study concludes that IS professionals who have migrated to client/server believe that legacy systems will continue to serve useful functions until middleware and systems management products mature. The \$250 report also examines issues such as brand usage and technology standards. Datapro, in Delran, N.J., can be reached at (609) 764-1000.

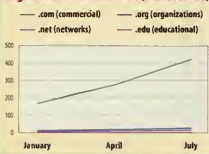
**A STRONGER VOYSS.** Telephony developer Voyss Corp. has created a consulting division to help customers find VARs and integrators capable of putting together computer telephony projects. Among the new services provided are interactive voice-response application development and computer-telephony integration consulting. Pricing for VAR Introduction Kits ranges from \$2,500 to \$5,000; call the Voyss Consulting Services Unit, in New York, at (212) 397-2400 for more information.

**HISTORY IN THE FILING CABINET.** The Library of Congress and Ameritech Corp. are working together to accelerate the growth of the National Digital Library. The partnership is offering grants to organizations with collections of historical American materials that can be put online. The \$2 million National Digital Library Competition is just one step toward the long-term goal of making millions of historical items accessible for free to the public on the Internet by the year 2000. Formal grant applications will be available Aug. 19 on the Library of Congress Web site at <http://www.loc.gov>. For more information, call the Library of Congress, in Washington, at (202) 707-1087.

### The Internet goes commercial

The number of commercial Internet domains registered with InterNIC has increased tremendously in 1996, far outpacing growth in other major categories

#### Registered Internet domains (in thousands)



### IS SURVIVAL GUIDE • BOB LEWIS

## You thought supporting users was tough, try real paying customers

**MANAGEMENT SPEAK:** We have to put on our marketing hats.  
**TRANSLATION:** We have to put ethics aside.

Thanks to the reader who provided this but prefers anonymity.

**M**Y ALTERNATIVE pointing device worked when I plugged a keyboard into the back of my laptop computer; otherwise, the laptop reported a keyboard error.

When I reached technical support for the gizmo, the manufacturer's representative diagnosed it as a basic input/output system (BIOS) problem.

"But it works with a Microsoft mouse," I pointed out.

"It's a problem with your laptop's BIOS," the representative repeated.

"Your literature says that you're 100 percent Microsoft software compatible," I added.

"We are," he replied. "Then why does a Microsoft mouse work but yours does not?" I asked.

"They use a four-pin interface," he explained.

"We use six pins."

"I guess that makes you 150 percent compatible," I replied, sarcasm getting the better of me.

"Well, I'm not going to argue with you," the representative answered.

Wise move. Here's the odd part: He knew how to fix my problem.

We've been talking about the differences between internal and external customers. Not everything is different, of

course. If an end-user calls to report a problem, don't argue — the user does have a problem.

Don't assume you're smarter, either. Not all end-users are stumps, you don't know everything, and you'll gain the respect of your end-user community if you show them respect. Explain what you're doing, tell them what to expect, show interest in how they're using technology, and leave them smarter than when you found them.

That's how you should treat real paying customers (RPCs). To use the technical term, too, and because of the Internet, you're going to have a whole lot more to do with them than you used to. That will be the healthiest shock we've had since the personal computer forced us out of our glass house.

The Internet, and more specifically, the World Wide Web, is like Christopher Columbus. Columbus wasn't the first explorer to reach the Western Hemisphere, but he was the first one who could not be ignored.

In similar fashion, customers have interacted directly with other technologies, but IS largely ignored them. (Did you build your company's fax-on-demand system? Do you know much about the automated call distributor, and have you added screen-pops, customer-controlled queuing, and data-directed call routing to it? Can you define Lifetime Customer Value? I rest my case.)

You can't ignore the Web, and so, prob-

ably for the first time, you have to start thinking about serving your company's RPCs. That will change everything.

For the better. Remember when you did feasibility studies, requirements analyses, external designs, and internal designs before you got around to coding systems a few years later? Forget it. You're going to start working in marketing time.

What's marketing time? That's how long your company takes to get new products, services, and pricing programs into the public awareness to beat your competition. Years? Forget it. You're going to be working in months. Sometimes even weeks.

That means a whole different way of designing and building systems. (We'll talk about how in a future column.)

Remember when you justified everything you did by showing how it would reduce costs or increase productivity? Forget that, too.

Now you're going to justify your existence based on how well you help the company attract new customers, retain the customers it has, and encourage every customer to do more business with you. When you're done reading *InfoWorld*, take a look at your current IS project list and mark the ones that have a discernible impact on your company's capability to attract and retain customers.

I'll bet that for most readers, it's better than the previous year's list but still pitiful. You're probably setting priorities based on the needs of your internal customers. Next year, see if you can bring external customers into your Systems Steering Committee (if it have one). For every proposed system, ask "How will this help us attract and retain customers?" You think you're having fun now? Wait until you facilitate that session.

From here on out, you are going to be face-to-face with real customers. And that really does change everything.

Bob Lewis is a Minneapolis-based consultant with Perot Systems Corp.

Write to him at [robert.lewis@ps.net](mailto:robert.lewis@ps.net), or join his forum on *InfoWorld Electric* at <http://www.infoworld.com>.

### Calendar

**August**  
25-29 Sapphire '96, Philadelphia. Annual SAP of America Inc.'s user conference. Contact Tamari Ellis, (503) 245-0905.

**September**  
4-6 Empower '96, Boston. Evaluating workflow and document management technologies. Contact Delphi Consulting Group, (800) 575-3367.

4-6 Internet & Electronic Commerce Show, San Francisco. Event designed to meet the needs of business executives

in charge of creating and promoting electronic commerce business strategies. Contact Expo Management Associates, (800) 423-4492.

8-11 Computer Training & Support Conference and Expo, Nashville, Tenn. Designed for IS training managers and help desk staff. Contact SoftBank Institute, (800) 348-7246 or [cts\\_96@shops.com](mailto:cts_96@shops.com).

16-20 NetWorld+Intergraph, Atlanta. This year's show will focus on the Internet. Contact SoftBank, (516) 578-6900.



17-19 DCI Data Warehousing Conference, Phoenix. Event featuring lectures and workshops on data mining, online analytical processing, Internet, and related technologies.

Contact DCI, (510) 470-3880.  
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# Air Products overhauls network to satiate bandwidth needs

■ Switched FDDI backbone handles 8,500 clients with no downtime and offers plenty of room to grow

By Amy Helen Johnson

**B**ASEBALL PLAYERS are notorious for their superstition, but they have nothing on the denizens of a rapidly growing company where life seems governed by temperamental, mysterious forces with powers to bless or curse, and whether you're smiling or frowning depends on where you are in the organization.

If you're the CEO in the corner office, you're grinning because sales are doubling each year. But a network administrator is more likely to be grimacing because client nodes and network servers are also doubling, the backbone is clogged, and the network diagram looks like a plate of spaghetti.

For Air Products and Chemicals Inc., a \$3.9 billion supplier of industrial gases, chemicals, and environmental and energy systems, with headquarters in Trexlerstown, Pa., the solution was to throw out the spaghetti and start cooking from scratch.

"We were losing control of the bandwidth because of the fact that servers were anywhere and everywhere," says Jeff Priester, Air Products' LAN/WAN engineering manager and head of the team that designed and implemented the company's new network infrastructure. Priester's 18-month, \$2 million re-engineering project cooked up a new backbone, a set of centralized server farms, upgraded desktop clients, and a sane LAN architecture that could be diagrammed. Most important, the networking department is now in control, instead of in chaos.

**SPAGHETTI NETWORK.** In 1989, Air Products needed only 50 servers to handle traffic from 500 clients; over the next six years, its network grew to 450 servers and 8,500 clients. That rapid, uncontrolled growth resulted in some bizarre LAN configurations. At first, servers sat next to employees' desks and whoever was close shared the server. But when people moved offices, they moved across the LAN so they could continue to connect to their own servers, even if the network services, files, and applications they needed were on nearby servers. Workgroup was a term found only in the dictionary.

The servers themselves ran OS/2 or Windows NT, with the majority of the new servers being NT boxes. In some areas of the company, especially research and development, employees logged onto Digital Equipment Corp.'s VAXes via Pathwork to get to the IBM mainframe using 3270 terminal emulation.

The client hardware was also a heterogeneous mix. Most employees worked on 386s running Windows 3.1, but Macintoshes were also represented. Traffic among those 450 servers and 8,500 clients ran over an FDDI backbone and a bridged network controlled by UB Networks Inc. hardware. Without clients segmented into logical workgroups, traffic on the backbone was higher than necessary. LAN-based backups were a severe problem. This chemical and gas company was choking.

**CLEANING UP.** These days the servers live in glass houses, spread among three data centers at Air Products' Trexlerstown headquarters. Priester has standardized the server configuration on Windows NT running on an Intel Corp. box. A few large engineering and client/server applications sit on Hewlett-Packard Co. servers running Unix; only a few VAXes, soon to be retired, remain.

There are no more Macintoshes on those 8,500 client desktops. Employees work on laptops or 133-MHz Pentium PCs running Windows for Workgroups or Windows 95.

The network connecting the clients and servers is a switched network based on 3Com Corp.'s LANtelligence switching technology. Priester runs switched Ethernet, at minimum, to every server. In some cases, when a server's load is more than switched Ethernet can handle, Priester uses either switched FDDI or switched Fast Ethernet. The switches run over a switched FDDI backbone controlled by the Digital Gigaset switch technology. Changing from a single-ring FDDI architecture to a 32-ring switched FDDI architecture significantly reduced the backbone's congestion; the single-ring backbone was running at 90 percent utilization.

Priester also used the re-engineering project as an opportunity to put IP routing in place, in anticipation of Air Products' future growth into the 10,000-client range.

**RECIPE FOR SUCCESS.** The keys to Air Products' successful new networking recipe were

researching and testing products. Priester's networking group maintains an in-house testing lab with an isolated network, where they test every piece of equipment before they buy and deploy it. Air Products spent two months evaluating switching equipment from

lems, users liked their desktops being on a local LAN. Proximity meant uptime and better performance, they thought.

The old thinking, however, was not applicable to the new network.

"Once we had demonstrated success,"

Priester explains, "it was easy to migrate the servers to the glass house." In fact, Priester says, his department's capability of isolating and preventing problems is four times better. It operates at nearly 100 percent uptime, with only one major unplanned backbone outage per year being predicted.

"Now when there's a problem," Priester boasts, "the network is the last thing that's suspected."

The last major challenge Priester's group faced was implementing the TCP/IP addressing. In order to switch from DECnet to TCP/IP, Priester had to find every

node on its corporate campus, reassign an address, and incorporate it into the new IP routing scheme.

"We put in some address-management software that found some IP nodes that we didn't know existed," Priester says.

Priester isn't done redesigning Air Products' network. Next on his list is replacing the 125 shared hubs that have become the network's bottleneck. The current UB hubs can't be segmented smaller than 50 to 100 nodes. The test lab is busy evaluating products from UB, Chipcom Corp., 3Com, Digital, Bay Networks Inc., and several others, searching for a solution that will reduce the segments to 25 nodes or less. Priester expects the evaluation to be finished in September and to start a six-month migration project in October.

Priester plans on moving toward the Dynamic Host Configuration Protocol (DHCP), which will allow him to hand out IP addresses to his growing number of laptop users. Laptops now make up many of the new PCs being bought by Air Products, and Priester is running up against the limitations of the newly implemented, rigid TCP/IP architecture. He envisions a future in which employees can plug into the corporate network from anywhere on campus, receive a DHCP address, and access the server farms. And that's something that would have never been possible with Air Products' old spaghetti network.

Amy Helen Johnson is a free-lance writer based in San Mateo, Calif.

IT TAKES BACKBONE to design an airtight network built on TCP/IP routing, switched FDDI, and ATM. Jeff Priester did the heavy lifting as Air Products' LAN/WAN manager.

3Com, UB, Cisco Systems Inc., and others before settling on 3Com's LANtelligence architecture. "We're skeptical," Priester says. "We actually tested the products in and put them on the bench. We like to see for ourselves."

In addition to solid performance, Priester looked for technologies that had the kind of modularity and flexibility that would allow them to work in the next incarnation of Air Products' corporate network. The TCP/IP routing will be able to absorb the anticipated increase in users; the 3Com switches have a second fast port that will become important when Priester rewires the corporate campus; and the switched FDDI backbone gives Priester plenty of room to grow bandwidth.

"We did a lot of soul-searching about what the backbone should be," Priester says. Because the 3Com LANtelligence switches were modular and flexible, Priester had a choice of Asynchronous Transfer Mode (ATM) and Fast Ethernet, as well as FDDI. Priester chose to go with what he saw as a risk-free solution — switched FDDI. Its stability was a major factor; Air Products can't afford to have its backbone down for even a microsecond, Priester says. Down the road, however, Priester will be evaluating ATM.

After Priester had defined the technology and products he would use in his re-engineering project, his next hurdle was overcoming the employees' reluctance to let their servers out of their sight. In an environment where network congestion was often the first thing blamed for an employee's server prob-

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DEVELOPERS' ADVOCATE · KEVIN STREHLO

# Good practices succeed; heroics are for key projects

**B**OB LEWIS upset a few readers recently by asserting that anyone with a semblance of a brain can be a programmer; heroes aren't required.

Sorry gang, I'm with Bob on this one. And if you disagree, it's a sure sign your programming shop's development process needs serious attention.

My e-mail address is below if you can't wait

to send a brilliantly scathing note.

## Average and kind of smart

It's true that in many application development shops heroic efforts by the very best and brightest people are required to get software out the door in good shape and on schedule.

But if that's true of your shop, you probably



need to pay more attention to improving software development practices. You may even need to steal some best practices from shops that used to be in the same boat you're in. Because, as much as every pro-

grammer would like to think that he or she is brilliant, there simply aren't enough brilliant programmers to go around.

We had a visitor named George George from Ovum Ltd. around our shop this week. George George asked me if our programmers were often there very late at night.

Smart guy, George. I believe he's actually written books about software process improvement, and part of his job was to assess our overall abilities and find out if we were likely to make our projected release dates.

It was with a touch of pride that I told him the only members of our development team losing sleep around our company had both just become parents. Their late-night heroics had more to do with spittle and colic than bugs and broken builds.

These people are doing three major releases this year, I told George. They could never produce that consistently for a long period of time if they were in constant crunch mode.

Clearly, there are some brilliant people on our programming staff, but our goal is to make the routine parts of producing software predictable, well-understood, and, frankly, so easy that even I could do it.

And if you had witnessed my struggle last week as I tried to get a beta ActiveX control from Microsoft to work correctly so that I could ship a little demo CD-ROM (uh, Kev, it's beta code and, uh, you shouldn't expect beta ActiveX controls to work correctly), you'd be pretty clear on whether or not I was a brilliant programmer.

Although if I'd been following best practices, one of which is to never depend on beta ActiveX controls, I'd have shipped on time.

## Brilliant skunks

Don't get me wrong. Brilliance and heroics have their place. Recently the late appearance of a new API gave us an opportunity to produce something our customers really needed.

We had fully scheduled our staff, but they weren't stretched to the breaking point or constantly pushing their intellectual limits just to get a program to work. Consequently, they were able to squeeze in a quick skunkworks proof-of-concept project and make a brilliant intellectual leap or two to overcome the shortcomings of that API.

People working on the ongoing release were able to pick up the pace when the skunkworks project became an official project. Somehow, everything managed to ship on time.

Did I say these people weren't brilliant, weren't heroes?

No, I said the right software development process makes it possible to save brilliance and heroics for times when they are needed.

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# PRODUCT COMPARISON

## Color printing solutions

# Office color not there yet

Only a printer with the best aspects of our top three scorers is compelling enough for widespread use, but what's left isn't bad: an ink-jet with fine output, a well-designed laser, and a speedy solid-ink printer.

#### COMPARED

##### Laser

Apple Color  
LaserWriter  
12/600 PS  
Apple Computer Inc.

HP Color  
LaserJet 5M  
Hewlett-Packard Co.

QMS magicolor CX  
QMS Inc.

Xerox Xprint  
4920 Plus  
Xerox Corp.

Ink-jet  
Epson Stylus Pro  
Epson America Inc.

HP DeskJet  
1600CM  
Hewlett-Packard Co.

Solid-ink  
Tektronix  
Phaser 340  
Tektronix Inc.

Thermal wax transfer  
Mannesmann Tally  
Spectra Star 280  
Mannesmann Tally Corp.



For several years, analysts and vendors have proclaimed that the corporate market for color printing is poised to explode. It's been a long fuse — and it's still burning. In the business world, color printing is a niche technology, used mainly by artists and executives. For most workers, there hasn't been a compelling reason to ask for color. It's just as well. For IS managers, the cost of adequate speed has remained too high for broad color deployment.

When color arrives, though, it won't go away. Not so long ago, everyone used monochrome monitors, too. Color was a luxury. Now, of course, it's almost standard. It's like watching Dorothy step out of her house into Oz for the first time. Once you see color, you wonder how you lived without it.

Like high technology in general, color printers of all types continue to experience incremental improvements in speed and quality, while prices edge ever lower. Is this the time? Has the industry found that elusive combination of speed, price, and quality that will produce critical mass in the corporate market? We approached this comparison with that question and found the answer to be: "No, not just yet."

**THE COLORS OF APPLES AND ORANGES.** There are a number of ways to bring color output to the corporate desktop, and we didn't want to limit ourselves to one class of color printers — laser printers, for instance. Why not, we thought, pit an ink-jet against a laser printer? Would the inherent strengths and weaknesses of each cancel out the other, or would a compelling choice emerge? And what about other color technologies? Solid-ink and thermal wax transfer printers, for instance, may not have mind share, but many swear by them; in some cases, sales figures back up the enthusiasm.

We kept our requirements to a minimum, looking for color printers of any type that could be networked via Ethernet to output PostScript files. To create a manageable test group, we focused on market leaders or printers recommended by major vendors. We tested four laser printers (Apple Computer Inc.'s Color LaserWriter 12/600 PS, Hewlett-Packard Co.'s Color LaserJet 5M, QMS Inc.'s magicolor CX, and Xerox Corp.'s Xprint 4920 Plus), two ink-jets (Epson America Inc.'s Stylus Pro and HP's DeskJet 1600CM), one solid-ink device (Tektronix Inc.'s Phaser 340), and one thermal wax transfer printer (Mannesmann Tally Corp.'s Spectra Star 280). For a peek inside the printers and an explanation of the technologies that make them work, see the photos on page 76 and the diagram on page 80.

June 17, page 12  
**QMS reads low-cost, Win95 color printer**  
 At PC Expo earlier this summer, QMS Inc. announced an addition to its magolor family — the WX. Listed at \$3,999, it's priced significantly lower than the other color lasers in this Product Comparison. There's a catch (for some of you): The printer is only compatible with Windows 95.

June 10, page 82

**A fine balancing act**  
 Who needs color, anyway? If you don't, take a look at our recent Product Comparison of five monochrome laser printers. Most of them handle multiprotocol environments with aplomb. You'll want to look beyond the specification sheets, though. Some of the more expensive devices don't live up to their high-rated speed claims.

## A guide to this comparison

### 080 How do they do that?

Each of the color technologies we looked at does its job very differently. Here's all you may ever want to know about crystals, lasers, caryons, and ribbons.



**078 Bells and whistles:** Choosing the hottest technology doesn't mean a thing if the printer doesn't have the features you need. This chart separates the haves from the have nots.

**Contents**  
**74** Report Card  
**76** How we tested  
**76** 50 ways to load your toner  
**78** Features chart  
**80** Benchmarks  
**80** A closer look at the technologies  
**82** The costs of consumables

## Results at a glance

\* Continued from page 1

ed if the advantages and disadvantages of each technology would cancel each other out, and for our top scorers, they did. Apple Computer Inc. played to its strengths with the **Apple Color LaserWriter 12/600 PS**. It's elegantly designed inside and out and was the easiest of the laser printers to get running.

Although pages from the Color LaserWriter looked good. It was easy to tell the difference between them and the luscious output of the **Epson Stylus Pro**, from Epson America Inc. At 720 dpi, it produced output that was clearly the best. This is the hope of color printing — documents that are sharp, rich, and faithful to on-screen tones. You can guess the downside: Print times were excruciatingly slow.

Rounding out our top scorers was **tektronix Inc.'s Tektronix Phaser 340**, a solid-ink device that's done well in the marketplace, most likely because its cost less and is rated faster than laser printers. Our benchmarks confirmed the speed claims, but the Phaser slipped to third overall because its PhaserShare software doesn't support NetWare 4.1, and its output was average.

Look out below — It's a full point drop to the next printer, **QMS Inc.'s QMS magolor CX**. We can't say anything terrible about the magolor CX, but there's not much to shout about, either. Except for the Color LaserWriter, output from the laser printers really disappointed us. Something always seemed to be wrong, and when a printer costs \$8,000 or more, that won't do.

### The Score

**7.2**

Apple Color LaserWriter 12/600 PS

**7.2**

Epson Stylus Pro

**7.0**

Tektronix Phaser 340

**6.0**

QMS magolor CX

**5.8**

HP Deskjet 1600CM

**5.8**

Xerox Xprint 4920 Plus

**5.6**

HP Color LaserJet SM

**5.4**

Mannebaum Tally Spectra Star 280

The magolor CX had particular trouble with banding and streaking in our transparency test.

Unlike the Stylus Pro, Ethernet support comes standard with the other ink-jet in the comparison, the **HP Deskjet 1600CM**, from Hewlett-Packard Co. Unfortunately, it was actually harder to network the Deskjet than the Stylus Pro because of the Deskjet's quirky administration software. And although it was slightly faster than the Stylus Pro

(more accurately, it was not as slow), the Deskjet's output on paper was far inferior.

**Xerox Corp.'s Xerox Xprint 4920 Plus** delivered even poorer output, partly because of a conflict between its drivers, Windows 3.1, and PageMaker 5.0. If we had thrown out the PageMaker test, the Xprint's output still wouldn't have come close to that of the Color LaserWriter or the Stylus Pro. Setup was a breeze, however. Only the Color LaserWriter was easier to get running.

HP's second shot in this comparison, the **HP Color LaserJet SM**, fared even worse than the Deskjet. From the moment we started putting this blocky beast together, the Color LaserJet seemed a generation behind the other laser printers. Perhaps it was that eye-popping price tag, or maybe we were just lousy from the toner we spilled during its archaic pour-and-shake installation.

**Mannebaum Tally Corp.** recently purchased the Spectra Star from Metal Management Inc., and the company has its work cut out if it wants to improve the new acquisition. The **Mannebaum Tally Spectra Star 280** uses the thermal wax transfer process, technology that seems as if it's best days are behind it. For most jobs, thermal was transfer is a fog with consumables, and it doesn't produce good-looking output on plain paper. In some ways, the Spectra Star is a lovely ruin — it's a compact, uncomplicated printer — but all those satisfactory scores really don't add up.

### CONTRIBUTORS

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There are other color technologies. However, dye sublimation printers — targeted at high-end markets such as advertising, where precise color fidelity is crucial — weren't intended for the standard business uses we were testing. And although we would have liked to include Citizen America Corp.'s dry-ink Printiva 600C, the company would not offer the printer for inclusion.

**WHAT WE FOUND.** An ink-jet and a laser printer tied for first, with the solid-ink device coming in a close third. However, these printers just barely cracked the 7.0 mark, which is relatively low for comparison's leaders. What's more, half of our roundup scored below 6.0 — less than an average score. As you can guess, we weren't overwhelmed with what we saw.

The laser printers disappointed us the most, especially with the image quality they produced. Although output was rarely unusable, there were noticeable flaws (particularly banding, contrast problems, and inaccurate color reproduction) in just about every page we printed, even on the coated paper recommended by the manufacturers. The problems were exaggerated on transparencies. Banding that seems subtle and unobtrusive on paper can be a literal showstopper when it's illuminated at several times its normal size. We knew that the laser printers were falling short in terms of image quality because we'd already seen what truly gorgeous output looked like — from the ink-jet Stylus Pro.

The Color LaserWriter and the Stylus Pro tied mainly because of that familiar price-performance trade-off, but it's hard to quantify value across so broad a price spectrum. However, consider that you could network six Stylus Pros for the cost of one Color LaserWriter, which would largely offset the speed issue in a high-volume, multiuser environment. Of course, this isn't the best solution for everyone. If you need a centrally located color printer for a large workgroup, pick the Color LaserWriter. But if your company works in smaller teams, five or six people, for instance, each group could have its own Stylus Pro.

A more compelling reason to pick the Stylus Pro may be that it doesn't have to be the slowpoke we forced it to be. Although we performed our benchmarks at each printer's highest resolution, we also printed at lower resolutions for comparative purposes. In the Stylus Pro's case, this significantly narrowed the tremendous disparity in print times. At 360 dpi, for instance, the Stylus Pro only took a little more than twice as long to print our PageMaker document than the average laser printer did. At 720 dpi, the ratio was approximately 8-to-1. More important, the Stylus Pro's 360-dpi output still looked better than what the laser printers could manage at 600 dpi.

Speed, however, is an issue for all of these printers, not just the ink-jets. It took the laser printers, for example, an average of 10 minutes to print our seven-page PowerPoint document. (See benchmarks, page 80.) If you're tweaking a presentation minutes before a meeting, you won't have time to print it out. In general, color printers are still too slow to be used for casual drafts. You'll likely give your document a twice-over before committing to a print job.

The good news on the speed front came from the dark (and fastest) horse of the comparison: the Phaser, a solid-ink printer that's 30 percent faster than the average laser printer we tested. And, although the Phaser costs less than most laser printers, it still lists for about \$5,000. What's more, its output quality is only average.

**COMING SOON?** So the golden mean of speed, price, and output quality hasn't been achieved yet. If not, when? You've heard it before, but this time we think it really is only a matter of time. About a year, in this case.

Two factors should open the gates to ubiquitous color printing in the workplace. First, a compelling reason for color output may have already arrived: the World Wide Web. As fast Internet connections are being established — desktop by desktop, in many cases — workers are discovering the Web can help them in all aspects of their jobs, from deep background to breaking news. And because the advantages of paper have been eclipsed by glass and light yet, workers are printing what they see on their screens — documents that are usually full of color.

Vendors see the potential and are working steadily to eliminate the stubborn price-performance compromise. One promising technology comes from Peerless Systems Group, in El Segundo, Calif. Company officials say their Memory Reduction Technology will lower print controller costs from today's \$1,500 to about \$400. The result according to Peerless: a \$2,500 color laser printer by late 1997.

Other vendors are sure to follow. By this time next year, there may be the first hints of a booming color market, and it won't be by executives who want to jazz up their presentations or art directors who want an ink-jet printer for each of their designers. The Web just may bring color to the workplace, and once color printers get that beachhead, there will be no going back.

## Report Card

## Color printing solutions

## GUIDE

- Rating  
Score in points

Individual reviews only listed, production versions of products, cover beta-test versions. Products or solutions receive ratings ranging from unacceptable to excellent in various categories.

Scores are derived by multiplying the weighting of each criterion by its rating, where: Excellent = 10 - Outstanding in all areas.

Very Good = 8 - Meets all essential criteria and offers significant advantages.

Good = 6 - Meets essential criteria and includes some additional capabilities.

Satisfactory = 4 - Meets essential criteria.

Poor = 2 - Falls short in essential areas.

Unacceptable or N/A = 0 - Fails to meet minimum criteria or lacks this capability.

Scores are summed to yield the final score out of a maximum possible score of 100. Products rated within 82 points of one another offer little. Weightings represent average relative importance to individual readers involved in purchasing and using the product or solution category. You can customize the Report Card to your company's needs by using your own weightings to calculate the final score.

The Test Center Hot Pick is InfoWorld's award for outstanding products or solutions. To receive the Test Center Hot Pick seal, a product or solution has to offer what InfoWorld deems to be a standard technology or set of capabilities that are unusually valuable to competitors. The product must also score at least satisfactory in all Report Card categories and receive a final score of 73 or higher.

	Weighting	Apple Color LaserWriter 12/600 PS	HP Color LaserJet 5M	QMS magicolor CX	Xerox Xprint 4920 Plus
<b>Performance</b>					
Hardware design and maintenance	15%	<p>Apple Computer Inc., Cupertino, Calif. (800) 462-4396, (408) 996-1010 fax: (800) 462-4396 <a href="http://www.apple.com">http://www.apple.com</a></p> <p>⚡Excellent ⚡1.5 Apple's talent for innovative and functional design shows with the Color LaserWriter. The cleverly designed rotating toner-cartridge carousel required less setup time when we first assembled the printer. The Color LaserWriter was also the only printer to offer a diagram on the status panel to help paper jams, and its primary tray had a printable paper-level indicator. Like the other laser printers, the Color LaserWriter weighs more than 100 pounds. It's sturdy, but its curves make it seem less bulky and imposing.</p>	<p>Hewlett-Packard Co., Palo Alto, Calif. (800) 752-0900, (208) 323-2551 fax: (800) 333-1917 <a href="http://www.hp.com">http://www.hp.com</a></p> <p>⚡Poor ⚡0.3 Have soap, water, and a vacuum handy when you set up a Color LaserJet — the only laser printer to use toner bottles instead of cartridges. To keep from making a mess, you'll need the hands of a surgeon to line up each bottle with its matching cavity in the printer, then slide a plastic tab to empty its contents. On the bright side, the control panel is extensive.</p>	<p>QMS Inc., Mobile, Ala. (800) 343-2696, (334) 633-4300 fax: (334) 633-4866 <a href="http://www.qms.com">http://www.qms.com</a></p> <p>⚡Very Good ⚡1.2 The magicolor CX and Xprint are just about identical, inside and out. One difference: The magicolor CX offers two front-panel slots for fonts, forms, and/or security cards. Like the Xprint, you must install four developer cartridges during initial assembly. The magicolor CX's media tray easily accommodates various paper sizes, and although you must load a developer drum — something the Color LaserWriter doesn't require — it was easier to accomplish than it was with the Color LaserJet.</p>	<p>Xerox Corp., Rochester, N.Y. (800) 349-3769, (716) 442-4028 fax: (716) 442-1339 <a href="http://www.xerox.com">http://www.xerox.com</a></p> <p>⚡Very Good ⚡1.2 Like the other laser printers (except for Color LaserWriter), Xprint forces you to load a developer drum during initial assembly. Fortunately, like the magicolor CX, this is quite easy to do: It pops in behind the front panel almost like a toner cartridge. The only noticeable distinction between the two printers — and it's a small one — is their control panels. Xprint indicates which color (cyan, magenta, yellow, or black) is being printed.</p>
Network and desktop administration	10%	<p>⚡Very Good ⚡0.8 Installation of Apple's software was trouble-free. The administrative software was simple, but adequate, and it was easy to navigate. Its printer-setup window is identical to the Xprint's, with six tabs for commonly used printer settings.</p>	<p>⚡Very Good ⚡0.8 The Color LaserJet software was much easier to install than the DeskJet's. We particularly liked the disk-image installation option, which let us create a custom setup and save it as a disk image on the network or other media that installation from any desktop.</p>	<p>⚡Satisfactory ⚡0.4 We couldn't run the CrownAdmin software over HTTP to configure our printer for NetWare; we had to load NetBIOS and NetUI. We had to install Windows PostScript drivers to print PageMaker documents. We liked the options for tracking QMS printers on the network.</p>	<p>⚡Excellent ⚡1.0 Composing Setup and Administration Services (for the administrator) and Status and Management Services (for the user), the Xprint Color LaserWriter offers printer software as well as many configuration options as the magicolor CX did — without the hassles.</p>
Speed	20%	<p>⚡Good ⚡1.2 Like the other laser printers, the Color LaserWriter performed fairly well but not exceptionally. And in most of our tests, it ran in the middle of the laser pack. However, it did take a little longer than average to print the Excel file.</p>	<p>⚡Good ⚡1.2 Among laser printers, the Color LaserJet was second to the magicolor CX. It made short work of our Excel and WordPerfect files but choked a little with the PageMaker document. Overall, cursor-regain time was also a little slow.</p>	<p>⚡Good ⚡1.2 Although it clocked in with the second fastest time, the magicolor CX was clearly beaten by the Phaser, especially with the demanding PowerPoint document. Cursor-regain time was better than average.</p>	<p>⚡Good ⚡1.2 The Xprint was the slowest of the laser printers due to its sluggish performance with the PowerPoint document. Only the Phaser handled the PageMaker file faster, however, and only the Color LaserJet beat it in the Excel test.</p>
Output quality	20%	<p>⚡Very Good ⚡1.6 Except for the Stylus Pro, the Color LaserWriter had the best overall output. It received high marks for its detailed graphics, smooth gradients, and bright saturated colors. We did observe banding and jagged edges on the transparencies, however.</p>	<p>⚡Good ⚡1.2 The Color LaserJet produced average output. Text looked good, although shadowed text was too faint. We saw a few jagged edges on the smaller graphics and slight banding on our photographs, but these were subtle. Overhead output, however, was dim and muddy.</p>	<p>⚡Good ⚡1.2 Although contrast was a little dark for our taste, we thought colored files were rich. Fonts were crisp and clear. The magicolor CX was the worst in the overhead test, however: Banding and streaking that seemed subtle on paper really showed up when illuminated.</p>	<p>⚡Poor ⚡0.4 Our photographic images were extremely dark and essentially unusable. According to Xerox, there is a conflict between the Xprint's print drivers, PageMaker 5.0, and Windows 3.1. The jobs in other applications were acceptable but far from outstanding.</p>
<b>Support and price</b>					
Documentation	5%	<p>⚡Good ⚡0.3 The documentation was well-written, offered sufficient diagrams, and included a quick-reference guide — but it didn't include any extras to distinguish it.</p>	<p>⚡Excellent ⚡0.5 We couldn't find fault with any of the Color LaserJet's documentation, and the troubleshooting section was the best of those compared.</p>	<p>⚡Good ⚡0.3 The Quick Setup guide illustrates instructions with cartoons. The full documentation was so comprehensive that we sometimes found it hard to follow.</p>	<p>⚡Excellent ⚡0.5 Manuals were well-written and thorough, and full of diagrams, but the extremely useful setup poster boosted Xprint to the top.</p>
Technical support	10%	<p>⚡Very Good ⚡0.8 It took a few minutes for both of our support calls to be answered. Our first technician was extremely friendly and knowledgeable. The second was helpful but not very cheerful.</p>	<p>⚡Excellent ⚡1.0 Our support experience with the Color LaserJet was just as good as it was with the DeskJet. Calls were answered immediately, and we couldn't have asked for more thorough assistance.</p>	<p>⚡Very Good ⚡0.8 Our calls were answered immediately, but the degree of assistance we received was just a cut below what we got from HP.</p>	<p>⚡Good ⚡0.6 We experienced long waits on hold during peak hours. Fortunately, the technicians we finally spoke with were courteous and knowledgeable.</p>
Support policies	5%	<p>⚡Very Good ⚡0.4 Apple offers a one-year warranty that includes free on-site support. The company also has a terrific support presence on the World Wide Web.</p>	<p>⚡Good ⚡0.3 As with its DeskJet, HP offers a one-year warranty for the Color LaserJet. The strong online support includes Web, FTP (File Transfer Protocol), and CompuServe.</p>	<p>⚡Good ⚡0.3 The magicolor CX has a 90-day on-site warranty only; a one-year extension is another \$599. QMS does offer a toll-free number and very thorough Web support.</p>	<p>⚡Good ⚡0.3 Xerox offers a one-year on-site warranty and plentiful online and telephone support options.</p>
Price	15%	<p>⚡Satisfactory ⚡0.6 Although it received a satisfactory score, at \$6,989, the Color LaserWriter was the least expensive of the laser printers.</p>	<p>⚡Poor ⚡0.3 The Color LaserJet nearly cracks the \$10,000 barrier (at \$9,595), but you get 36MB of RAM — an advantage if you're grinding out intensive graphics jobs.</p>	<p>⚡Satisfactory ⚡0.6 The magicolor CX lists for \$7,999 — a midrange laser printer. It comes with 32MB of RAM.</p>	<p>⚡Satisfactory ⚡0.6 With the \$612 Ethernet kit, the Xprint (\$7,295) costs almost as much as magicolor CX — but it has only half the RAM.</p>

Final score

7.2

5.6

6.0

5.8



## INK-JET

### Epson Stylus Pro

Epson America Inc.  
Torrance, Calif.  
(800) 922-8911, (310) 782-0770  
fax: (310) 782-5284  
<http://www.epson.com>

#### Good 0.9

The Stylus Pro comes with two ink cartridges: one black and a three-in-one color cartridge. Installing and removing them is easy, but the two-cartridge scheme means you don't get the most out of your tones. If you run out of blue, for instance, you must replace the entire color cartridge. The Stylus Pro loads paper very intelligently. When we fed single sheets into the printer at a slightly crooked angle, it automatically straightened them before pulling them in.

#### Very Good 0.8

We had to add an Ethernet card to the Stylus Pro, but that was a snap. Loading the administrative software and drivers was easy. Connecting to the server and creating a print queue took a few clicks. The status box showed print-time elapsed (in seconds) and remaining time (a bar graph).

#### Poor 0.4

The only bright spot for the Stylus Pro was its strong showing with our test-only document. Of course, there's little point in getting a color printer if you're just printing text. Otherwise, the Stylus Pro finished last or next-to-last in all of our tests.

#### Excellent 2.0

With the highest resolution, the Stylus Pro promised to deliver the best-looking output. It did. We printed transparencies at 360 dpi. Epson's recommended setting, without a perceptible loss of quality. The blue background of our transparencies looked slightly purplish, however.

#### Very Good 0.4

Everything was well-organized, including an index, quick-start card, and troubleshooting section. Illustrations were plentiful; there was detailed online help.

#### Very Good 0.8

Our calls were answered immediately, and our questions were transferred to a courteous and knowledgeable technician who helped us until our problems were resolved.

#### Very Good 0.4

The Stylus Pro has a two-year warranty, but without on-site support. Epson has a Web site, BBS, Compuserve forum, and fax-back technical library.

#### Excellent 1.5

We added an Ethernet board (\$399) and the PostScript option (\$210) to the base Stylus Pro (\$479), but our total cost of \$1,088 was still a steal for a color printer.

### HP Deskjet 1600CM

Hewlett-Packard Co.  
Palo Alto, Calif.  
(800) 752-0900, (208) 323-2551  
fax: (800) 333-1917  
<http://www.hp.com>

#### Good 0.9

The Deskjet uses four ink cartridges, a more efficient scheme than the Stylus Pro's two. They also snap in and out slightly easier. The Deskjet's front-panel controls, however, are far inferior to the Stylus Pro's. The printer's reset button is unmarked, and its four indicator lights are labeled only with cryptic icons. The inefficient design had us thumbing through the documentation to look for operating functions. In its favor, the Deskjet's paper capacity and options rival those of some laser printers.

#### Satisfactory 0.4

Connecting the Deskjet to our network wasn't awful, but it was very quirky. We were forced to use DOS to connect to the server and create a print queue, and we had to launch JetPrint and JetAdmin with the File Manager rather than just double-clicking on their icons in the Program Group.

#### Poor 0.4

Slightly faster than the Stylus Pro, the Deskjet was still — how shall we put this — lessimpy! The Deskjet's decent results in our PageMaker and PowerPoint tests kept it out of last place, but it was glacial with our Excel and WordPerfect documents.

#### Good 1.2

The Deskjet produced bright and sharp overheads — the best of those compared. Unfortunately, other output was average or below average. Photographs were slightly grainy and had a dark tint. We also observed some banding.

#### Very Good 0.4

The manuals were thorough and well-organized throughout. We also appreciated the special section for users with color-vision deficiencies.

#### Excellent 1.0

Our calls were answered immediately, and in both instances, the technicians were friendly and offered very specific, thorough explanations.

#### Good 0.3

The Deskjet's standard warranty lasts for one year with no on-site support. HP covers other boxes with strong online support and automated phone service.

#### Good 1.2

At \$2,479 list price, the Deskjet comes network-ready. Still, it's more than twice the price of the Stylus Pro we configured with an Ethernet card.

## SOLID-INK

### Tektronix Phaser 340

Tektronix Inc.  
Wilsonville, Ore.  
(800) 835-6100, (503) 682-7377  
fax: (503) 682-2980  
<http://www.tek.com>

#### Very Good 1.2

We liked the elegant, sloped look of the Phaser. As with the laser printers, a recessed paper tray makes the printer seem solid and compact. The Phaser, however, is much smaller than the laser printers. There's no way to make a mistake when loading the four ColorStar — each is shaped to correspond to a matching slot in the printer. Finally, although you don't need the optional transparencies tray to print transparencies — they work fine from the main tray — it's handy if you print a lot of presentations.

#### Good 0.6

Tektronix's PhaserShare administrator software doesn't support NetWare 4.1. You have to use the NetWare Administrative Utility under Windows or PDNOSL under DOS to set print queues. We liked the Status Monitor, which provided real-time information about printer activity.

#### Very Good 1.6

Although it didn't live up to its specification sheet, the Phaser was the champ. Thanks to its one-pass technique, the printer shines where a color printer needs to: handling complex documents filled with photographs and graphics.

#### Good 1.2

A close second to the Deskjet in our overhead test, the Phaser produced sharp but slightly dark transparencies. As with several of the other printers, small graphics were jagged on paper and photographs were slightly grainy.

#### Good 0.3

Each manual was well-written and illustrated, but they made so many references to one another that we wished they had been consolidated into one or two.

#### Very Good 0.8

Tektronix answered our calls immediately but then transferred us to support staff. On both of our calls, the technicians stuck with us patiently until our problems were solved.

#### Very Good 0.4

In addition to strong standard support, Tektronix offers either a one-year off-site or a 90-day on-site warranty.

#### Good 0.9

Tektronix positions the Phaser (\$4,995) against color laser printers. The printer costs \$2,000 less than the Color LaserWriter and \$4,000 less than the Color LaserJet.

## THERMAL WAX TRANSFER

### Mannesmann Tally Spectra Star 280

Mannesmann Tally Corp.  
Kent, Wash.  
(800) 223-0990, (206) 251-5500  
fax: (206) 251-5520  
<http://www.tally.com>

#### Satisfactory 0.6

It took some careful maneuvering, but we were able to install the Spectra Star's tri-colored ribbon without wrinkling or damaging it. Unfortunately, if you use the printer much, you'll get a lot of practice changing the ribbon; it has a capacity of only 340 color pages. You also have to switch to a separate ribbon if you want to print on transparencies (the kinds of jobs a thermal wax transfer printer excels at) or coated paper. On the bright side, the Spectra Star is the most compact printer in the roundup, and its control panel is easy to use.

#### Very Good 0.8

With its friendly drop-down menus and concise dialog boxes, the PRINTSET utility sped us through the Spectra Star's setup. The utility also configures the Spectra Star's Ethernet cartridge, which comes with the printer, in either DOS, Windows 3.1, Windows 95, or Macintosh System 7.

#### Good 1.2

The Spectra Star was competitive, just slightly slower than the laser printers. Its overall corner-remain time was the best, but the few seconds it saves don't mean much with 5- or 10-minute print jobs. It also struggled with the text-only file.

#### Satisfactory 0.8

The Spectra Star confirmed that thermal wax transfer technology is traditionally strong with transparencies. Images were sharp, although our blue background images almost looked real. On other jobs, photographs were very grainy and washed out, and in some areas, text looked faded.

#### Satisfactory 0.2

The quick-start, cleaning and maintenance, and troubleshooting sections were good. The manual looked like it was assembled piecemeal; the index had many errors.

#### Satisfactory 0.4

We had to leave our name and phone number for a return call, which we didn't receive the next day. Fortunately, the support person we finally talked to was friendly and helpful.

#### Satisfactory 0.2

The acquisition of the Spectra Star has confused Mannesmann Tally's support options. We found a data sheet at its Web site. There's a one-year warranty.

#### Very Good 1.2

At \$3,650, the Spectra Star was the least expensive non-ink-jet printer in the comparison.

## SMART MOVE

Tektronix positions the Phaser against color laser printers, and the printer is classified as a color laser-class printer by Computer Intelligence InfoCorp. for the purposes of market-share figures. The strategy has been effective. According to Lyra Research Inc., the Phaser has outsold every desktop color laser printer on the market.

## MISSING IN ACTION

Citizen America Corp.'s Printing 600C, which we were unable to include in this comparison because the company would not offer it for inclusion, uses yet another type of color technology — a CMYK dry-ink process Citizen calls Micro Dry. The Printing prints at 600 dpi, using powdered inks that are heated, then fused onto the page. Because the ink is never wet, output is waterproof and smudge-resistant. At \$599, the Printing is targeted at the ink-jet market, and it has comparably slow print times. According to Citizen, it takes between 3 and 5 minutes to output a single color page.



## HOW WE TESTED

FOR THIS COMPARISON, we wanted to test a range of color printing technologies, not just a single product class. As a result, we kept our requirements for inclusion to a minimum, looking for color printers that could output PostScript files on an Ethernet network.

To focus our efforts, we tested market

leaders in each technology category or printers recommended by leading vendors.

We created a standard Ethernet network and connected each printer to it via a single, direct 10Base-T connection. We used a Pentium-based Hewlett-Packard Co. NetServer 5/90 LM running NetWare 4.1 for our server.

The NetServer had 32MB of RAM, three Seagate Technology Inc. ST31200N SCSI drives, an on-board Adaptec Inc. 7770 SCSI controller, and a Compaq Computer Corp. Netflex Ethernet card.

To speed our testing, we used two identical Dell Computer Corp. Pentium P90s as workstations. Each had 16MB

of RAM, a 1GB SCSI hard drive, a Number Nine Computer Corp. GX264 video adapter with 4MB of video RAM, and a 3Com Corp. Etherlink III SC5X9 network card.

To simulate an isolated network, we connected all of the workstations and printers to the server through a Cabletron Systems Inc. MMAC-M8FN8

### ONLINE MANAGER

Once you assign an IP address to the Phaser, you can use Tektronix's highly touted HTTP-based PhaserLink utility to manage the printer. PhaserLink runs over TCP/IP networks, letting you configure the printer, access usage statistics, and perform routine troubleshooting through your Web browser of choice. PhaserLink works outside the firewall as well, with integrated links to online support at Tektronix's Web site.

### PRINTER NEWS

It may be called the *Hard Copy Observer*, but Lyra Research Inc.'s monthly newsletter doesn't critique the TV tabloid show. It's all about printers, with product and trade-show announcements and stories about industry trends. Newtonville, Mass.-based Lyra offers a number of other services, most notably its annual Guide to the Printer Industry. Its Printer Evaluation Series (in conjunction with CompMetrics, in Mobile, Ala.) delivers highly technical evaluations of recently released printers approximately every three weeks. You can check out all Lyra has to offer at <http://www.lyra.com>.

## 50 ways to load your toner (seven, actually)

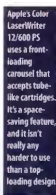


LASER



LASER

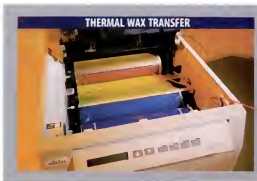
For two of the laser printers in this comparison, QMS magicolor CX and Xerox's Xprint 4920 Plus, you load toner from the top, popping the "hood" and snapping in the bricklike cartridges.



Apple's Color LaserWriter 12/600 PS uses a front-loading carousel that accepts tube-like cartridges. It's a space-saving feature, and it isn't really any harder to use than a top-loading design.

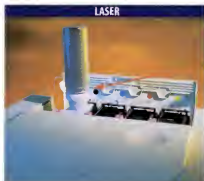


LASER



THERMAL WAX TRANSFER

Mannesmann Talley's Spectra Star 280 has a spool of tinted "panes" of material, each of which (cyan, magenta, or yellow) is heated in turn and bonded with paper to produce the color image. Black is achieved by combining the three colors.



LASER

HP's Color LaserJet 5M requires you to empty the contents of toner bottles into cavities in the printer. It's a much more difficult (and messier) procedure than using cartridges.



INK-JET

Epson's Stylus Pro uses a black and a three-chambered color cartridge, which means that you must replace the entire color cartridge when a single chamber runs dry.



INK-JET

HP's DeskJet 1600CM uses four separate disposable cartridges (CMYK), which snap in and out easily.



SOLID-INK


Tektronix's Phaser 340 has four slots under the printer's hood for its crayons (Tektronix calls them ColorStix). Each slot is shaped differently and accepts a correspondingly shaped crayon. You can't mistakenly put a crayon in the wrong slot — It won't fit.

# A typhoon of data hits Tokyo every day.



Tools.h++ + NTES = Reliability!

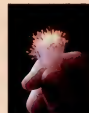
## With Rogue Wave, NEC Telecom Systems controls the storm.



"We like Tools.h++ because it offers the 'nuts and bolts' we need, such as dictionaries and strings."

Voice and data travel through Tokyo's wide-area telecommunications network with lightning speed. Mr. Yukio Akai, senior manager at NEC Telecom Systems, is responsible for the network management software that helps to route this storm of data. He knows that top-quality software helps NTES distinguish its wide-area network equipment from that of its competitors. So when the latest C++ rapid application development project hit, he turned to the Tools.h++ class library for its reliability, portability and ease of use.

NTES' network management software uses a client/server model to observe Tokyo's flood of net-



work activity and administer its network nodes. Among other things, Tools.h++ provides the classes needed to act on messages from the client and manage primitive data structures. As Mr. Akai says, "It's important that the software we

write on Unix machines translates easily to PCs. And, we knew that code written with Tools.h++ would be dependable at runtime."

NTES chose Tools.h++ because it offered reliability and functionality amidst a whirlwind of telecommunications data. Contact us today to find out how Rogue Wave's Tools.h++ can help you handle the storms on your radar screen.

Available for  
Windows, OS/2,  
Unix, and  
Macintosh.  
Rogue Wave  
offers a full  
line of C++  
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products.

Visit our web site at <http://www.roguewave.com>  
or call our sales department at (800) 487-3217.

Mr. Yukio Akai  
Senior Manager,  
NTES

The Software Parts Company™



Rogue Wave  
SOFTWARE

## Features

### Pulling out the bells and whistles

	LASER				INK-JET		SOLID-INK	THERMAL WAX TRANSFER
• Yes / No	Apple Color LaserWriter 12/600 PS	HP Color LaserJet 5M	QMS magicolor CX	Xerox Xprint 4920 Plus	Epson Stylus Pro	HP DeskJet 1600CM	Tektronix Phaser 340	Matsushita Tally Spectra Star 280
List price	\$6,989	\$9,195	\$7,999	\$7,907	\$1,088 <sup>1</sup>	\$2,479	\$4,995	\$3,050
Color technology	Laser	Laser	Laser	Laser	Pigment electrophoretic ink-jet	Thermal	Solid-ink	Thermal wax transfer
Highest standard color resolution (dpi)	600 by 600	300 by 300	600 by 600	600 by 600	720 by 720	300 by 300	300 by 300	600 by 300
Top-rated color speed (pages per minute)	3	3	6	3	1	4	4	2
Print engine	Canon	Konica	Not available	Xerox-specified Hitachi	Epson	Not available	Tektronix	Sharp
Color tone/ink/crayon/ribbon life	4,000 pages at 5 percent coverage	3,000 pages	4,000 pages	4,000 pages at 5 percent coverage	670 pages at 5 percent coverage <sup>2</sup>	1,600 pages at 15 percent coverage	3,000 pages	342 pages <sup>3</sup>
Standard RAM (MB)	12	36	32	16	Not applicable <sup>4</sup>	6	8	10
Maximum RAM (MB)	40	76	64	48	Not applicable <sup>4</sup>	72	24	32
Width by height by depth (inches)	21 by 18 by 23	24.4 by 14.8 by 19.3	20.5 by 14.6 by 22.2	21 by 15 by 24	19 by 7.2 by 20.9	20 by 11 by 17	15.8 by 13 by 19.8	13.5 by 11 by 17.5
Base-configuration weight (pounds)	110	102.5	106	108	16.5	25	68	46
Noise level when printing (decibels)	55	67	58	55	47	Not available	53	40
Largest paper size (inches)	8.5 by 14	11 by 17	8.5 by 14	8.5 by 14	8.5 by 14	8.5 by 14	8.5 by 11	8.5 by 11
Proprietary transparencies recommended	■	■	■	□	■	■	■	■
Proprietary coated paper recommended	■	■	□	□	■	■	□	■
Warranty length	1 year	1 year	90 days	1 year	2 years	1 year	1 year <sup>5</sup>	1 year
Free on-site service	■	□	■	■	□	■	□ <sup>6</sup>	□
<b>Language support</b>								
PCL5	□	■	■	Optional	□	■	□	□
Adobe PostScript 2	■	■	■	■	Optional	■	■	■
HPGL	■	■	■	Optional	■	■	■	■
<b>Network support</b>								
Ethernet	■	■	■	Optional	■	■	■	■
Token Ring	■	Optional	■	Optional	□	Optional	■	■
Local Talk	■	■	Optional	■	■	■	■	■
<b>Desktop OS support available</b>								
Windows 3.1	■	■	■	■	■	■	■	■
Windows 95	■	■	■	■	■	■	■	■
Windows NT	■	■	■	■	■	□	■	■
DOS	□	■	■	■	■	■	■	■
OS/2	□	■	■	■	■	■	■	■
Macintosh System 7	■	■	■	■	■	■	■	■
Unix	■	■	■	■	■	■	■	■
<b>Network OS support available</b>								
Novell NetWare 4.1	■	■	■	■	■	■	■	■
Microsoft LAN Manager	■	■	■	■	■	■	■	■
IBM LAN Server	■	■	■	■	■	■	■	■
Windows NT	■	■	■	■	■	■	■	■
Windows for Workgroups	■	■	■	■	■	■	■	■
SunOS/Solaris	■	■	■	■	■	■	■	■
SCO Unix	■	■	■	■	■	■	■	■
IBM AIX	■	■	■	■	■	■	■	■
AppleTalk	■	■	■	■	■	■	■	■
Banyan Vines	□	■	■	■	■	■	■	■
HP-UX	■	■	■	■	■	■	■	■
AT&T System V	□	□	■	■	■	■	■	■
UnixWare	■	■	■	■	■	■	■	■
DEC VAX	■	■	■	□	■	■	■	■
BSD Unix	■	■	■	■	■	■	■	■

1. Printer (\$7,295) and Ethernet kit (\$412)  
 2. Printer (\$479), Ethernet board (\$399), and PostScript support (\$210)  
 3. At 300 dpi  
 4. Coated paper and transparencies — plain paper yields slightly less  
 5. Firmware-based  
 6. 90-day on-site warranty also available  
 7. Use printer daemon

► If you have questions or comments about this Product Comparison, please contact Chip Brookshaw at chip\_brookshaw@infoworld.com.

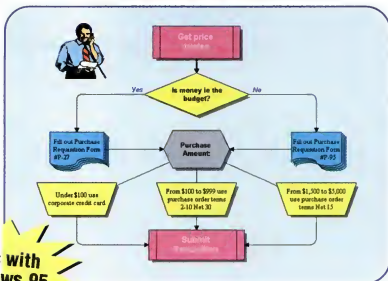
#### THEY'RE BACK

After being out of the market for five years due to a noncompetitive agreement with its spin-off (Lexmark printer unit (now Lexmark International Inc.)), IBM re-entered the network-printer arena with a bang about six weeks ago with its announcement of four business-class machines: one color and three monochrome laser devices. The IBM Network Color Printer is shipping now and lists for \$8,999. It comes standard with 16MB of RAM and promises to deliver 3 pages per minute (ppm) of color output (12 ppm for monochrome and 1.5 ppm for transparencies) at 600 dpi.

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Get price quotes.  
Is money in the budget?  
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Fill out Purchase Requisition  
Form #P-27.  
(No)  
Fill out Purchase Requisition  
Form #P-15.  
Purchase Amount:  
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credit card)  
(From \$100 to \$999 use purchase  
order terms 2-10 Net 30)  
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purchase order terms Net 15)  
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## SAVING MEMORY

Peerless Systems Corp. has a broad range of OEM customers for its Memory Reduction Technology (MRT), including Canon, Xerox, and IBM. The company expects to supply these customers with MRT-based controllers early next year. Simply put, MRT is an imaging and rendering technology that treats text, photographs, and computer-generated graphics as separate objects, allowing the most appropriate compression and decompression techniques to be applied to each. The memory savings means a color laser printer could use only 4MB to 8MB of RAM (three to nine times less than the printers in this comparison) without reductions in performance or image quality.

## PRODUCT COMPARISON

## concentrator.

We tested with Microsoft Corp.'s DOS 6.2 and Windows for Workgroups 3.11, performing a clean installation for each printer. Our test suite included Microsoft's Office 4.3 Professional and Novell Inc.'s WordPerfect 6.1.

## PERFORMANCE

## Hardware design and maintenance

Color printers require a lot more elbow grease during assembly than monochrome devices, and we paid special attention in this category to any

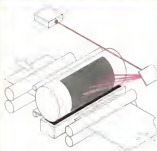
hardware-related setup issues, including toner and drum installation. Color printers also need attention after they're set up — a potential headache for administrators. Your users aren't likely to open and load toner bottles as they are to pop in a cartridge, for instance. If

it's difficult, it becomes your job.

We also used this category to examine typical design issues such as a printer's dimensions, control panels, and external ports. And because a printer that produces flawless copies is useless if it's always jamming, we checked paper

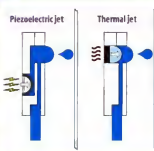
## A look inside the printing technologies

## Laser



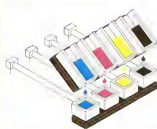
Laser printers employ the electrophotography techniques used by copiers. A laser sprays a light-sensitive drum with bursts of light, producing an "image" of charged and discharged areas. Cartridges dispense a fine layer of toner, which adheres only to the charged areas of the drum, creating a physical image that can be transferred to paper. For the next job, a static-charge eliminator neutralizes the drum while a blade scrapes it clean. Color laser printers use CMYK toner cartridges, and the drum must be charged, coated, discharged, and scraped for each color.

## Ink-jet



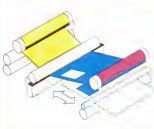
An ink-jet printer works just the way its name implies — droplets of ink are sprayed from a print head directly onto the paper. However, the two main ink-jet technologies use different means to "jet" the ink. The piezoelectric method (represented in this comparison by Epson's Stylus Pro) uses tiny crystals in the ink reservoir that expand when electrified, forcing a droplet of ink from the print head. The thermal-heat technique (used by HP's Deskjet 1600C) uses a resistor to quickly boil reserved ink, creating a vapor bubble that pushes ink out of the nozzle.

## Solid-ink



Although similar to the piezoelectric ink-jet in that it uses crystals to force ink through a print head, solid-ink technology differs in how it delivers that ink to the reservoir chamber. Rather than using disposable cartridges filled with liquid ink, solid-ink printers melt crayon-like blocks, then channel the resulting fluid to the printing chamber. The waxy ink resolidifies as soon as it hits the paper, preventing bleeding and creating a slightly embossed feel.

## Thermal wax transfer



Thermal wax transfer technology is a variation on the method used to produce traditional facsimiles. The most important part of a fax is actually the paper, which darkens when warmed by heating elements in the facsimile's print head, producing images and text. The print head in a thermal wax transfer printer, on the other hand, warms a ribbon that reacts to heat, producing an image that is simultaneously transferred to ordinary paper.

## Benchmarks

## Solid times from solid-ink

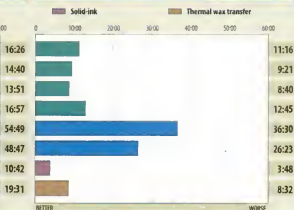
It wasn't a surprise: The ink-jet printers were as slow as molasses running uphill on a cold day. Our tests showed that they took between three and five times longer to print our suite of four documents (a one-page Excel worksheet with charts, graphs, and text; a one-page PageMaker file with text and three photographs; a seven-page WordPerfect text-only document; and a seven-page PowerPoint file) than the laser, thermal, and solid-ink printers. The solid-ink Phaser was the clear overall speed champ, and it did especially well with the PowerPoint document — the most demanding of our tests. The magicolor CX was the fastest of the laser printers. The thermal wax Spectra Star was as fast as the laser printers when printing graphics files, but its overall score was hurt by a poor showing in the text-only test.

## Total print time — four-document suite

Times in minutes:seconds



## Total print time — PowerPoint document





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paths for accessibility and internal areas for instructions. Printers that offered minimal control features received a score of satisfactory.

## Network and desktop administration

All of the printers include software that must be loaded to use them over a network, and we followed each manufacturer's instructions to complete a standard installation for Ethernet.

For a score of excellent, installation and setup had to be extremely easy and intuitive, and the software had to have a range of useful configuration options for both the administrator and the user. We gave lower scores if important features were missing, if the software was difficult to understand and use, or if we had to call technical support for printer setup.

## Speed

Performance, of course, is crucial, especially in a business environment, and we tested these printers with an eye toward corporate use rather than graphic design needs. As mentioned, our test suite included four common business applications. At each printer's highest resolution, we printed a one-page Microsoft Excel document that included charts and graphics, a seven-page Corel Corp. WordPerfect text-only file, a one-page Adobe Systems Inc. PageMaker document with text and three photographs, and a seven-page Microsoft PowerPoint presentation.

We summed the four times for each printer and scored the results as follows: less than 6 minutes, excellent; 6 minutes to 12 minutes, very good; 12 minutes to 24 minutes, good; 24 minutes to 48 minutes, satisfactory; 48 minutes to 96 minutes, poor; and more than 96 minutes, unacceptable.

## Output quality

With one exception, we examined output produced at each printer's highest resolution using vendor-supplied coated paper and transparencies. Epson America Inc., however, recommends printing transparencies at 360 dpi instead of 720 dpi, and we followed its suggestion. We deducted points for inaccurate color, fuzzy edges, fading, bleeding, dithering, and poor contrast. When illuminated, transparencies often reveal banding and striping not obvious in natural or room lighting, so we also examined transparencies through an overhead projector.

## SUPPORT AND PRICE Documentation

There is nothing more frustrating than trying to set up a new product with obtuse, disorganized documentation. We looked for manuals that were well-written, informative, and easy to use. We expected an index and plentiful diagrams and illustrations. Documentation that contained even minor errors could score no higher than satisfactory.

## Technical support

In this category, we evaluated the quality and availability of technical support based on multiple anonymous calls to the vendor. For a score of excellent, support staff had to answer our questions correctly and offer unsolicited advice. We subtracted points for long waits on hold, ignored phone messages, and technicians who were less than knowledgeable or courteous.

## Support policies

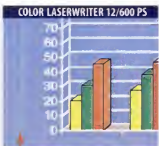
We looked for a one-year warranty as a minimum and awarded extra points if on-site service was included. Because so many vendors have an online

presence, we examined the quality and depth of that support — especially on the World Wide Web — rather than just awarding extra points if they had it at all.

## Price

Because we were examining a range of color technologies, prices fell on a very wide distribution. Scored prices included whatever extras were needed to make a printer ready to print PostScript files over Ethernet.

A total cost less than \$2,000 rated an excellent score; \$2,000 to \$4,000, very good; \$4,000 to \$6,000, good; \$6,000 to \$8,000, satisfactory; \$8,000 to \$10,000, poor; and more than \$10,000 was unacceptable.



Even though its output quality was generally good, Apple's Color LaserWriter, like most of the printers in the comparison, suffered from banding and streaking on the overheads — flaws that really show up when illuminated. Epson's Stylus Pro delivered the best overall output of the comparison. The printer produced deep, rich colors on the transparencies while still keeping the text sharp.

# CAMILLE DIED OF CONSUMPTION; YOU DON'T HAVE TO

By Jeffrey Gordon Angus

THE BIG, LURKING ISSUE that rates color-printer buyers is consumables. "Sure," they say to themselves, "purchase prices are down, but I bet I'll have to spend an arm and a leg for the paper, toner, and other supplies."

The tragic heroine in the film "Camille" sacrifices all in the name of love. Lucky for you, if you have your heart set on a color printer, the consequences won't be nearly so dire.

Partially, it's the \$2 or so most copy shops charge for a page of laser output. That round number looms large in buyers' minds. Also, the thought of having to be the gatekeeper for that showy hunk of equipment to prevent overseas managers thinking it's easier to skip the whole purchase.

Consumables are a consideration: The printers in this comparison cost between 7 cents and 62 cents per copy (see chart). Although that may mean changing your behavior a little — printing fewer trial-and-error drafts, for instance — it shouldn't be a deal breaker. Remember, top-of-the-line monochrome laser printers cost from 4 cents to 10 cents per copy, and although people were conser-

vative about spending that much when laser printers first appeared, most behave as if that's nothing to worry about now.

Most users view the price hit of color consumables as minimal — when the application justifies it. For example, Vincent Versace, owner of the Los Feliz, Calif.-based Versace Natural Light Photography Studio, has been using Epson's Stylus printers for a year and a half.

Versace says his business completely relies on the printers. Versace has calculated that a 26-page book of 40 color images costs less than \$4 to print.

Tony Hurd, general manager of Six Foot Two Productions, an animation house in Lakewood, Calif., uses his QMS

magicolor LX (a close cousin to the CX) to produce promotional materials that are a lower cost alternative to sending out scores of demonstration reels. Yet it's still eye-catching to potential clients.

Despite the Test Center's experience with Mannesmann Tally's Spectra Star 280, Gloria Petterson Boggs, a technology specialist at Mountain View, Calif.-based Tencor Instruments Inc., swears by it. Although she originally used it to show defects in highly magnified scans of silicon wafers, the printer has come in handy for many unforeseen applications since then.

That's common when a small company or department gets its first color

printer. Jim Meredith, a computer manager at San Diego-based civil-engineering company Boyle Engineering Corp., says there's an application curve for a device like his HP Color LaserJet.

"At first you just try everything with it, a time where everyone goes 'Aha' and wants to try it out," Meredith says. After that wears off, Meredith explains, there are several months of focused experimentation and, eventually, a lot of creative new applications.

We tried to take the cost of consumables beyond the realm of the anecdote by examining vendor-supplied data and the list prices of replacement parts. However, because there are so many variables among these printers, the figures in the accompanying chart should be used as an outline only. One thing's for sure, though: Except for the Spectra Star and its single-use ribbon, costs depend greatly on how much color is laid down on a page.

You'll also want to consider the value of your own labor when evaluating these figures. Ink-jet printers must be resupplied more often than laser printers. If you print a lot of color output, the real cost of consumables could be a lot higher than the price of a spare ink cartridge.

## Costs

### Costs of color consumables, per page

	Laser <sup>1</sup>	Ink-jet <sup>2</sup>	Solid-ink <sup>3</sup>	Thermal wax transfer <sup>4</sup>
20%	10 cents to 20 cents	7 cents to 10 cents	13 cents to 14 cents	56 cents to 62 cents
50%	21 cents to 25 cents	18 cents to 21 cents	29 cents to 33 cents	56 cents to 62 cents
95%	39 cents to 44 cents	34 cents to 38 cents	57 cents to 61 cents	56 cents to 62 cents

- Apple Color LaserWriter 12/600 PS, HP Color LaserJet S40, QMS magicolor CX, and Remtek Xerox 4020 Plus
- Epson Stylus Pro and HP DeskJet 1600CII
- Tectronics Phaser 340
- Mannesmann Tally Spectra Star 280

## CONTRIBUTOR

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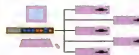
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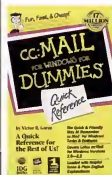
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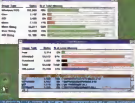
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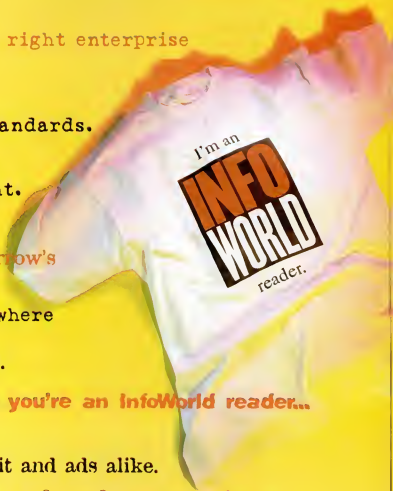
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\*Enterprise Networking demographic edition only

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## Upcoming in InfoWorld

**AUG. 19 ENTERPRISE COMPUTING FEATURE:** More and more employees surf the World Wide Web, use e-mail within and outside of their companies, and pull information off the Internet. This phenomenon has had a large impact on the way we do business, but it has also raised concerns about electronic privacy. This feature looks at what you need to know and what policies you need to develop to protect your corporation and yourself.

**PRODUCT COMPARISON AS/400-TO-LAN CONNECTIVITY:** If your company has invested in AS/400 technology but has also implemented a LAN, it makes sense to integrate the two. Doing so allows your end-users to access AS/400 data through PC applications. There are a number of options for making the connection, such as using a gateway or TCP/IP. The trick is figuring out the right combination of technologies and products for your site. We look at AS/400 Client Access for Windows 95, from IBM; Extra Personal Client 6.1, from Attamatch; Client Access for SAA/AS/400 Edition, from IBM and Novell Inc.; Reflection for the AS/400 6.0, from Walker-Ridder and Quinn Inc.; Rumba Office 95/NT 5.0, from Wall Data Inc.; and SNA Server 2.11, from Microsoft Corp.



**IBM'S CLIENT ACCESS for Windows 95** is one AS/400-to-LAN connectivity option in our Aug. 19 comparison.

of C2-level security. Microsoft Corp. has always touted Windows NT's C2 security, but how many people know what that means? We take an in-depth look at what it means to have C2 security and how you can ensure that your systems are secure.

**IN FUTURE ISSUES ENTERPRISE COMPUTING FEATURE:** Protecting your electronic communications from attacks by hackers can be done by encrypting e-mail and other data. But with several encryption technologies as well as legal considerations, implementing encryption can be a difficult task. We'll sort out the state of encryption.

**PRODUCT COMPARISON HTML CONVERSION TOOLS:** The idea of posting company information on an intranet is catching on like wildfire. The new Web publishing tools make it relatively easy to create sites, but bringing existing documents into the pages requires reformatting the files to HTML. For this comparison we test four Windows programs that let you convert typical business documents to HTML: Cyberfast 2.0, from Interleaf Inc.; HTML Transit 1.0, from InfoAccess Inc.; Island InLink 2.0, from In-T Systems Inc.; and Web Publisher Professional 1.1, from SkSoft Publishing Corp. **ENTERPRISE COMPUTING FEATURE:** Managing a large number of relationships with vendors can be an unwieldy task. How do you track their performance and assess whether it makes sense to bring projects back in-house? This feature will explore the growing number of outsourcing relationships and how you can keep them under control.

**PRODUCT COMPARISON BACKUP SOLUTIONS:** Backing up a mixed-platform network is a dirty job, but more and more IS managers have to do it. We test four solutions for reliability over several platforms, including Windows NT, Windows 95, Windows for Workgroups, Unix, and Macintosh. Our solutions include ArcServe, from Cherney Software Inc.; Backup Exec, from Seagate Software Inc.; NetWorker for Windows NT, from Legato Systems Inc.; and StorageExpress, from Intel Corp.

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## Desktop and network operating systems

# NT 4.0 getting better all the time

## Workstation the next desktop for those who can afford the hardware

By Jeff Symcois

Microsoft Corp.'s Windows NT Workstation 4.0 the right product for your corporate desktop systems? First you have to ask, "What's your corporate desktop?" If you have the appropriate hardware and the right range of business needs, NT Workstation is the clear choice over Windows 95. However, although NT Workstation may be suitable for the most recent machines, legacy hardware, notebook systems, and frugal memory deployments will make Windows 95 a better bet.

Overall, I was pretty impressed with the shipping version of NT Workstation, which should be generally available at the end of this month or the beginning of September. The Windows 95 Explorer shell upgrade is well-implemented in NT Workstation, and 3.x diehards can still run Program Manager and File Manager if they insist. However, the product's lack of support for Plug and Play, power management, and other features standard in Windows

95 makes Windows NT an inferior choice for the portable market.

I couldn't help but notice that some of the extended utilities that Microsoft bundled with Windows 95, such as a disk-defragmentation utility and Microsoft Fax, are missing. (Microsoft said it is leaving that market open to third-party providers.) The NT File System is, after all, inherently different from Windows 95's, so Microsoft couldn't just port the tools. Windows NT does offer a graphical Check Disk capability from the properties page of a volume object.

Aside from the new interface, the Version 4.0 upgrade displays Microsoft's concerted effort to integrate support for many new technologies. Going beyond Version 3.51, Version 4.0 adds a host of technologies, such as Telephony API, DirectX APIs, such as DirectDraw, DirectSound, DirectPlay, and DirectInput, and the Distributed Component Object Model. These and other additions, along with the previously supported OpenGL, help bring NT Workstation 4.0 up to date; it's poised to become the top choice for a multimedia or graphics platform as technologies such as DirectX take off.

In addition, the fault-tolerance management capabilities continue to get better. The new version of the Task Manager offers great monitoring and termination capabilities at both the application and process level. Task Manager's graphical view of CPU and of memory utilization supports multiple processors and is a great reference resource. Also included is an NT version of Microsoft's Diagnostics, a helpful troubleshooting tool.

### Is there an intranet in the house?

Microsoft wants to be sure that everyone gets a chance to use its Web tools, so it is targeting the intranet market with NT Workstation. NT Workstation is laden with intranet-rich features, including a 10-connection license of Peer Web Services, which is actually the Internet Information Server's PPTP

## Latest Server gets big boost from easier administration, 'net apps

By Brooks Talley

Microsoft Corp.'s introduction of Windows NT Server 4.0 unsurprisingly reflects the strengths and weaknesses of all the previous editions of NT Server 4.0, with better integration and somewhat improved performance.

If you're already running NT Server, this upgrade is obvious; but this version won't make you forget NetWare. If you're still shopping for an application server, however, then NT Server has much to offer, especially for Internet and intranet use.

Overall, I didn't find anything to

3.51 to Version 4.0. The hardware was an Advanced Logic Research Inc. Revolution Q-SMP with two 166-MHz Pentium processors, 64MB of RAM, and the ALR ADAC RAID controller — hardly an unusual hardware platform.

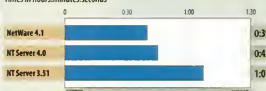
Unfortunately, NT Server does not come with drivers for the ADAC, and ALR has not yet made them publicly available. My upgrade ended with the familiar but depressing blue screen of death. A phone call to ALR yielded a beta copy of the NT Server 4.0 drivers for the ADAC, and I was on my way again, this time with no problems.

## Windows NT Server gains on NetWare

Although Windows NT Server 4.0 handily beat Version 3.51 in our file-and-print test suite, it still lags behind NetWare 4.1

### File-and-print test suite

Times in hours:minutes:seconds



suggest that NT Server 4.0 is more than an incremental upgrade with a suite of Internet applications. (See Product Reviews, May 27, page 101, and Feb. 12, page 93.)

For example, of the features offered in NT Server 4.0, Distributed Common Object Model (DCOM) has the most potential, but NT Server doesn't actually ship with any DCOM applications.

Although NT Server 4.0 makes a dramatic improvement over Version 3.51 in file-and-print speed, this latest Version still lags behind NetWare 4.1 in that area. Worse, in my tests of online transaction processing, NT Server 4.0 was slightly slower than Version 3.51.

### One OS, one install

I ran into the first glitch when I tried to upgrade an existing NT Server

The next eyebrow-raiser was the licensing agreement, which strongly advised me not to use Java-based applications for mission-critical applications, such as air traffic control or nuclear reactor management. The installation continued smoothly, and, after choosing which of the NT Server components to install, the server restarted and came up properly.

Upon logging in to NT Server 4.0, I noticed the new user interface — the most evident change from Version 3.51. Gone is the dreaded Program Manager, which always had a personal grudge against me; in its place the Explorer shell seems like a godsend — probably not a huge issue on a server but still a nice improvement.

After logging in for the first time, I confirmed that my previously in-

- Arpeggio for the Desktop ..... 100
- Statlab 2.1; Databoard 2.2 ..... 100
- Down to the Wire, by Nicholas Petreley ..... 102
- VisualAge for Basic ..... 102

### THE VISION THING

Microsoft Corp. may have an Internet strategy, but with Lotus Notes 4.5, Lotus Development Corp. demonstrates its Internet vision. Nicholas Petreley explains the difference.

### TALK BACK

Questions, comments, kudos? Send a message to the reviewer editor at dan\_sommer@infoworld.com. Please include "Talk Back" on the subject line.

stalled copy of Microsoft SQL Server 6.5 was still running and happy. Then I tried a number of file-and-print operations from clients to ensure that the upgrade was truly transparent to the clients. It was, but network access from fast clients was noticeably quicker.

NT Server has a slew of administration wizards, which purport to make an IS job easier but will probably be used only by people setting up bare-bones, single-server networks. Other new features that will probably rate a big yawn from the

### THE BOTTOM LINE

#### Windows NT Server 4.0

- Pros:** Superior performance compared to Windows 95 on high-end machines, especially with graphically intense applications; peer Internet services; Task Manager offers greater control over unrunny applications.
- Cons:** Inferior performance at 16MB of RAM compared to Windows 95; lacks integrated support for notebooks; no automated upgrade from Windows 95.
- Pros:** Improved file-and-print services; easier administration; bundled Internet applications.
- Cons:** Still no directory services.

Microsoft Corp., Redmond, Wash.; (800) 426-9400, (206) 882-8080; <http://www.microsoft.com>.  
Prices: \$11,129 for 10 clients; \$659 for another 20 clients; \$539 to upgrade for 10 clients.  
Ship date: September.

IS community include the somewhat annoying "Welcome to Windows NT" help screen that comes up at the system's first boot and the now-feeble Network Monitor, which can only capture and view packets originating from or

» SERVER PAGE 99

### THE BOTTOM LINE

#### Windows NT Workstation 4.0

Microsoft Corp.'s newest operating system is a robust release with many new features, but its still memory requirements and lack of support for key features should limit its deployment to high-end desktops.

**Pros:** Superior performance compared to Windows 95 on high-end machines, especially with graphically intense applications; peer Internet services; Task Manager offers greater control over unrunny applications.

**Cons:** Inferior performance at 16MB of RAM compared to Windows 95; lacks integrated support for notebooks; no automated upgrade from Windows 95.

Microsoft Corp., Redmond, Wash.; (800) 426-9400, (206) 882-8080; <http://www.microsoft.com>.  
Prices: \$19,149 to upgrade from Windows 3.x.

Ship date: September.

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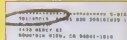


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### 8. How many hard drives do you want installed?

### 9. What capacity hard drives do you want installed?

### 10. What type of video do you want installed? (Write in code)

- (A) SVGA (D) Active Matrix VGA  
(B) VGA (E) Passive Matrix VGA  
(C) MonoVGA (F) Other

### 11. What additional drives do you want installed? (Write in code)

- (A) 1.2 FD (D) SCSI  
(B) CD ROM (E) Other  
(C) Tape Backup

### 12. What operating systems do you want installed? (Write in code)

- (A) MSDOS (E) OS/2 Warp  
(B) Windows (F) NetWare 3x  
(C) Windows 95 (G) NetWare 4x  
(D) Windows NT (H) UNIX



# Server

Continued from page 97

traveling to the server on which it's running.

In the architecture not much has changed in Version 4.0. Probably the most significant difference is the relocation of video drivers into Ring 0—a change that I'm not particularly happy about, because this makes server stability more dependent on video drivers.

Microsoft moved the drivers to improve the performance of NT Workstation and to maintain a common driver model between the two products. NT Server received the change as well.

## All things IP

Microsoft has focused on making NT Server a more desirable platform for Internet and intranet servers, and it shows in the wide range of bundled applications and services.

The Domain Name System (DNS) server that was offered in Beta 1 is an overlooked and underappreciated addition to NT Server. I found it to be even quicker in the release version, and its administration features will make many Unix

DNS administrators green with envy. The coupling of Windows Internet Naming Service and Dynamic Host Configuration Protocol makes NT a very palatable choice for a DNS server.

Internet Information Server (IIS) 2.0 is another welcome bundled application. Offering a replacement for the anemic FTP (File Transfer Protocol) server included in NT 3.51, as well as Web and Gopher servers, IIS further positions NT Server as an out-of-the-box Internet server.

One nifty new feature of IIS 2.0 is its Web-based management capability. Using a Web browser, administrators can perform virtually every function available from the standard IIS Manager program, except starting and stopping IIS.

Complementary to IIS, NT Server includes the Index Server, which automatically indexes all of the HTML documents on the server and provides a forms-based search engine that can be easily integrated into a Web site.

Other IP-related enhancements include Multilink Point to Point



THE WEB-BASED administration tools in Internet Information Server 2.0 allow access to almost every aspect of the server.

Protocol (PPP), which allows several slower PPP channels to be aggregated into one faster connection, and the Point to Point Tunneling Protocol, which can be used to set up virtual private networks over the Internet.

## Still missing 'you

NT Server 4.0 is still missing some of the features network administrators need most, including a real directory services architecture. NT Server's domain model was fine for setting up small networks, but the complexity of its trust relationships grows exponentially with network size—not a cheery thought for administrators of hundreds of servers. Microsoft has promised a pre-

view edition of its next-generation directory services some time before the end of the year. NT Server's long-term success in the enterprise may depend on how well that preview is received.

But no matter how impressive the preview, it's unlikely that many administrators will trust something as important as directory services to a beta implementation—so large-scale NT Server deployments will continue to be an administration nightmare.

Also missing from NT Server 4.0 are Microsoft Fax, Plug and Play, Direct 3D, and support for infrared, Universal Serial Bus, and IEEE 1394 (Firewire). Fax, Direct 3D, and infrared support should be available for download within weeks or months, Microsoft said.

## Server, I got your numbers

In benchmark tests on a single-processor ALR Revolution 4, a 166-MHz machine, NT Server 4.0 demonstrated a huge improvement over Version 3.51 in file- and print applications, although still lagging behind NetWare 4.1's performance. I tested all three operating systems using a benchmark that was first used in our product comparison of switching hubs. (See Product Comparison, Oct. 30, 1995, page 80.)

NT Server 4.0's nearly 35 percent improvement over Version 3.51 shows that Microsoft's attention to the network stack has paid off, but it's doubtful that NT Server will ever achieve the speed seen by Novell Inc.'s assembly-language-based engine; NT Server 4.0 still followed NetWare 4.1 by about 10 percent.

In my Microsoft SQL database tests on the dual-processor server, I was surprised to find that NT Server 4.0 offered no improvement over Version 3.51. In fact, at 2 hours, 47 minutes, 28 seconds to Version 3.51's 2 hours, 47 minutes, 7 seconds, Version 4.0 proved to be even a slightly slower.

Microsoft devoted a lot of attention to streamlining every layer of the network stack. Between the lowest-level driver (hardware abstraction layer) and the network applications there are as many as five steps that every packet must go through on its way into or out of the machine. Even small improvements in this code can speed things up a lot.

Brooks Talley is a technology analyst on the InfoWorld Test Center's networking solutions team. Send him e-mail at [brooks\\_talley@info-world.com](mailto:brooks_talley@info-world.com). Technology Analyst Jeff Symoens contributed to this review.

# Workstation

Continued from page 97

(File Transfer Protocol), Gopher, and HTML servers. However, because NT Workstation does not offer the robust networking services of NT Server, it is only recommended in a peer environment, rather than as a server. Unlike with NT Server, Workstation doesn't come

and support for multilink/channel aggregation over ISDN and analog phone lines. PPTP is a standard on the rise that allows virtual private networks to operate through a secure tunneled protocol session using the Internet as the transport. Multilink/channel aggregation allows you to combine the bandwidth of two ISDN lines, for example, for a single data connection.

Another addition to Version 4.0's networking collection is a Novell Directory Services (NDS) client, but I was a bit disappointed with it. Although the client offers user authentication to an NDS tree, log-in script support, and browsing of the NDS tree for network resources, it can't actually log in to the NDS tree. Therefore, you won't be able to access many NDS services and NDS-based applications with the NetWare administration utility.

## Missing pieces

Components due out in service packs or upgrades

- Internet Explorer 3.0
- Desktop fax capability
- Direct3D
- Infrared support

Components held for NT 5.0

- Plug and Play support
- Integrated power management
- Windows Driver Model
- Universal Serial Bus/IEEE 1394 support

with a copy of Microsoft's HTML authoring tool FrontPage, so you're on your own for producing content.

Microsoft has also expanded some of the networking functions in this release, but you'll see more direct effects of that in NT Server.

Some of the expanded capabilities in NT Workstation are Point to Point Tunneling Protocol (PPTP)

and 32MB RAM configurations and compared Windows NT's performance with that of Windows 95.

I wasn't surprised that NT Workstation outperformed Windows 95 under certain conditions but lagged

behind in others. In general, NT Workstation will outpace Windows 95 in high-memory configurations and offers particularly good performance on Pentium Pro systems, because Microsoft has taken advan-

tage of several optimizations for the Pentium Pro.

On my Pentium Pro 200, configured with 32MB of RAM, NT Workstation's application performance ran roughly 20 percent faster than Windows 95. NT Workstation showed particular performance gains in heavy graphics-oriented tasks, such as drawing and presentation graphics applications. However, on the same system, configured with 16MB of RAM, NT Workstation finished 37 percent behind Windows 95.

While multitasking, 32MB of RAM was again the sweet spot for performance gains with NT 4.0, especially for the Pentium Pro system. The 133-MHz Pentium also benefited in multitasking with 32MB of memory, yet showed no gains when running with 16MB of RAM.

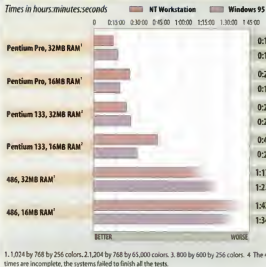
Regarding 486 performance, I have three little words: Don't do it. Microsoft claims you can run NT Workstation on a 25-MHz 486 with 12MB of RAM, but my 66-MHz machine couldn't complete all of the performance tests, whether with 16MB or 32MB of memory. Anything less than a Pentium system would be a mistake.

Jeff Symoens is a technology analyst at the InfoWorld Test Center. He can be reached at [jeff\\_symoens@info-world.com](mailto:jeff_symoens@info-world.com). Brooks Talley contributed to this review.

## Memory the key to NT Workstation

With 32MB of RAM, Windows NT Workstation 4.0 beat Windows 95 in all CPU types we tested. On a Pentium Pro system, NT workstation outperformed Win95 by 20 percent. With 16MB of RAM, however, Windows 95 holds the edge.

### InfoWorld applications test suite



► Data retrieval and report publisher for SQL and ODBC relational databases

## Arpeggio turns data into information

► Modules make database information available to everyone

By Geoffrey Hollander

**A**RPEGGIO for the Desktop is Concentric Data Systems Inc.'s solution to the difficulty of getting information to the people who need it. By enabling users to access, query, and publish information from any database in the corporate enterprise network, Arpeggio's suite of retrieve and report applications simplifies the key phases of turning data into usable information.

Using the Arpeggio Data Access module, you can create queries with a simple drag-and-drop between selected tables and a query grid. You can run queries against complex relational databases without having to understand SQL. Arpeggio provides ODBC drivers that talk directly with IBM DB2 databases (mainframe or AS/400), Distributed Relational Database Architecture, or any relational database supporting ODBC.

Each query you create becomes an independent object, which can be stored in Data Access or Data Organizer to be used in combination with other objects. The Data Organizer stores report, query, and shortcut objects for quick, easy access. Objects can be run individually or batched for more effective output.

The Report Designer provides some basic desktop publishing tools, including automatic line format, graphics import, line/box drawing, and shading. Reporting aids and tools, such as starter templates, a dictionary (to save often-used calculated fields), spreadsheet calculations, user-defined grouping and sorting levels, and a bonded layout enable you to start publishing custom views of your business information within a couple hours.

Report Designer also has ready-made templates that support most popular mailing, shipping, disk, and generic labels, as well as a full array of custom label options. The lack of U.S. Postal Service barcode support, however, is a serious oversight — considering the expense of non-automated mail.

The Arpeggio Report Viewer views and prints previously generated queries and reports. The Shortcut Maker will automatically create shortcut icons for queries and reports. They can be configured to preview before printing, print without previewing, or create user prompts to build a query on the spot.

I was able to create and edit well-organized and attractive reports faster — even while learning Arpeggio — than using the typical banded report writers found in most popular database programs. Being able to quickly jump between the Designer's layout screen and the Report Viewer to see how you're doing is a real time-saver.

Arpeggio for the Desktop is a logically organized answer for business users, but that's also its Achilles' heel. Each section of Arpeggio is a



THE REPORT DESIGNER offers a basic set of publishing tools to help you make your report ready to view or print.

separate application — interactive and logical but not intuitive. An integrated control center providing access to all Arpeggio areas would

greatly help. A processing wizard that would take you from the first stages of picking your data source to the final preview and a dialog box that asks if you want to turn this into a shortcut would be great tools for most business users.

Also, the fragmented way of arranging what is basically a sequential set of tools wouldn't be as frustrating with a map of the region. Arpeggio currently provides no printed documentation, and I found the online help to be inadequate — in many cases, too general to be of much use.

My confusion began with the installation when I was asked which modules I wanted to install. The online help gave no clue as to which I needed (or didn't need), what the modules did, or how they interacted. Concentric Systems says it is currently correcting this.

Geoffrey Hollander is a consultant, trainer, and writer on database and computer issues. His Internet address is [mpouch@europa.com](mailto:mpouch@europa.com).

### THE BOTTOM LINE

#### Arpeggio for the Desktop

**A**rpeggio is still one of the most powerful and easy-to-use information-publishing applications available, and based on what it can do, it's worthy of consideration. **Pros:** Queries any SQL, Distributed Relational Database Architecture, or ODBC relational database; fast solution for data access, transfer, organization, and report publishing; output to printer across a network, intranet, the Internet, or via fax or e-mail. **Cons:** Interface fragmented between interactive but separately run applications; currently unavailable printed documentation; frustratingly inadequate online help; mailing labels don't support U.S. Postal Service barcodes.

**Concentric Data Systems Inc.**  
Westborough, Mass.; (800) 325-9035,  
(508) 366-1122; fax: (508) 366-2954.  
Price: \$500  
Platforms: Windows 95, Windows NT

### ► Windows statistical analysis software

## Databoard puts a pretty face on frumpy Statlab

By Alan J. Fridlund

**S**tatlab 2.1 and Databoard 2.2 are two products from slip InfoWare Inc. designed, respectively, for exploratory data analysis and reporting results. They're core components of InfoWare's integrated User Information Suite, which includes other applications (not reviewed here) for geographic mapping, time series analysis, quality control, and multi-dimensional database management and querying. Statlab is an acceptable product with little that's special to recommend. Databoard, on the other hand, lets you build neat interactive reports of your numerical and graphical results.

Statlab offers the basics in data management and analysis. You can enter data right into its spreadsheet editor or import data from Excel (but only Version 5.0 or earlier, which excludes Excel for Windows 95). I was also able to import ASCII, SPSS, and Systat files directly. Statlab can do all the usual data management chores: select cases for analysis; recode or transform variables in all the standard ways; and compute new variables from existing ones, using ranks, math functions, and logical operations.

I couldn't directly create subfiles of selected cases and variables, and concatenate or merge data files. However, incorporating all data files' variable names, types, and de-

scription in a centralized data dictionary is a nice touch, because it allows quick one-pass editing of the entire file.

Statlab has a good range of standard statistical graphs: bar, line, and pie charts; scatter, box, and sun-ray plots; and scatterplot matrices. But it lacks xyz (pseudo-3-D) plots and plot rotations, which are becoming standard exploratory tools.

Statlab let me readily obtain the most needed descriptive statistics on each of my variables, cross-tabulate my variables, get tabular statistics, such as chi-square, and do a variety of nonparametric and parametric means tests. Statlab can handle more complex procedures, including correlation (but, apparently, not partial correlation), multiple regression, principal components and discriminant analysis, and multiple-correspondence analysis. Its analysis of variance is limited to a simple one-way design. If repetitive analyses are part of your work, Statlab provides a Pascal-like macro language for automating data handling and analysis, but there's no macro recorder.

Each Statlab analysis result was displayed in its own window, which means no integration of results. This is where Databoard comes in. It allows Statlab tabular data to be placed in fancy shaded tables on a report page, along with customizable graphs (including pseudo-3-D

bars and pies). It's entirely object-oriented, so all the elements can be moved, copied, and resized, embellishments can also be added, such as bit-map symbols, graded backdrops, and legends.

Using Databoard's macro lan-

### THE BOTTOM LINE

#### Statlab 2.1; Databoard 2.2

**I**t's a mixed verdict: Statlab offers mediocre statistics and data management, and Databoard offers uniquely interactive statistical data reporting, which, unfortunately, is too tied to Statlab. Francophiles will love the untranslated French error messages and Eurocentric sample data sets. **Pros:** Statlab: good graphical interactivity, basic statistics easy to accomplish; Databoard: interactive, customizable statistical reports. **Cons:** No Windows 95 support; Statlab: poorly organized and indexed manuals; scanty on-screen help; no xyz plots or plot rotation, very limited analysis of variance; Databoard: no stand-alone report player.

**slip InfoWare Inc.**, Dallas: (214) 757-7850; fax: (214) 757-7851; [info@slip.com](mailto:info@slip.com); <http://www.slip.com>  
Price: Statlab: \$300; Databoard: \$600.  
Annual maintenance: \$50.  
Platforms: Windows 3.x or later, Macintosh.

guage, you can construct a report template that can operate on successive sets of raw data and recompute tables and charts on the fly. I was impressed by Databoard's flexibility — no other statistics package approaches it. Databoard's real promise, however, is in offering interactive on-screen reports, but the lack of a stand-alone player is a major liability.

Statlab and Databoard, like their suitmates, are all French imports. (They are part of the French statistics package, slip Statistics.) This explains why, when I tried to run the Statlab demo on a 768-by-1152-pixel display, I received a rather error message in French.

There are other translation glitches and awkward constructions throughout the packages. For example, a "ponderation" check box is included among the univariate analysis options. I searched in vain for a definition and explanation of the option. (I think the authors mean "weighting.") Sometimes the term "dossiers" was used instead of "folders." None of this is fatal, just annoying or misleading.

Alan J. Fridlund is a psychology professor at the University of California at Santa Barbara. He has worked extensively with statistical software since 1976. His e-mail address is [alan\\_fridlund@info.world.com](mailto:alan_fridlund@info.world.com).



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DOWN TO THE WIRE · NICHOLAS PETRELEY

# The Domino effect: Lotus stages impressive comeback with Notes 4.5

**A** PROMINENT BUSINESS JOURNAL recently devoted several articles to praise Microsoft Corp.'s quick recovery from getting caught with its Internet pants down.

Granted, Microsoft will probably make it (half-naked) to the top. And it's a trendy story that's easy to write (and write, and write): Windows 95 browser interface, Wintel, ActiveX, Exchange, Windows NT momentum, yada, yada, yada, Microsoft wins. Spell check. Save. Print it again, Sam.

Personally, though, I find the emerging Lotus Notes comeback far more interesting. The Internet caught Lotus Development Corp. as much by surprise as it did Microsoft. Lotus reacted by reshaping its long-term business vision for Notes around the Internet.

Microsoft's Internet product strategy, on the other hand, is just that—a product strategy. It has no vision beyond the desire to bludgeon Netscape into oblivion by leveraging Windows 95 and Windows NT to make Netscape products irrelevant. And whereas Lotus must innovate to be competitive, Netscape is Microsoft's research and development department. Every time Netscape breaks new ground, Microsoft can take it into Windows and offer it free.

## Take notes

In the eyes of many, intranets turned Notes—

a product nobody seemed to understand—into a dead-end proprietary product nobody seemed to understand. In response, Lotus rendered the intranet vs. Notes argument moot with a product called Domino. Domino gives users Web browser access to Notes. (Point to <http://domino.lotus.com>, register, and try Domino with your own browser.)

That's dandy, but here's what makes the Lotus turnaround so fascinating: When Lotus delivers Notes 4.5, which integrates Domino and other Web components into the server, it won't simply make Notes competitive with existing Web servers. Notes 4.5 leapfrogs Web servers. It redefines the category by opening up Notes' well-developed groupware features to the World Wide Web.

Among the most valued of those features will be the ability to develop Notes applications and access them via Web browsers. Notes also brings its coveted threaded discussions to Web browsers, something most vendors are having a terrible time simulating with Common Gateway Interface scripts.

Another advantage Notes 4.5 brings to the Web is a highly granular level of security. Notes can manage access to everything from databases to individual data fields.

Most important, though, is Notes' unique capability to offer a dynamic, structured, hierarchical view of unstructured informa-

tion. This is totally lacking in today's Web servers. Notes can do this because it sees documents as a hybrid combination of database fields (such as date, author, subject, or any other custom field) and unstructured content. The ability to select from vast numbers of documents by ordered custom fields will become indispensable as Web sites grow.

It's not all roses yet. If you run Domino today, you may notice that some of Notes' features do not survive the trip to a Web browser. This is a side effect of the stateless nature of browsers. (They connect, get data, and then disconnect.) It is a problem but not one unique to Notes. Lotus needs to address it, however, and will probably do so using Java.

## Take my advice

Aside from that, I can think of only a few minor course corrections for Lotus. First, Lotus shouldn't spend a lot of effort advancing proprietary technology. Replication will soon lose its relevance as a means to give all users access to the current version of a document.

In the past, corporate Notes servers were sprinkled across different physical locations by necessity. For example, the Chicago office doesn't have a leased-line connection to New York, so the two sites synchronize at night via a slower, temporary connection.

As more corporations use leased lines to link to the Internet and to other offices, however, it will make more sense to cluster Notes servers and keep them at one centrally managed site.

Second, Lotus needs to recognize that Notes is a terrific *at*. It's where we put things we don't want to throw away, but we don't want cluttering up our house. Lotus should

leverage this and build hierarchical storage management capabilities into Notes. It would be a real boon to have Notes automatically push infrequently accessed information out to cheap storage.

Finally, Lotus needs to repeatedly pledge support for CORBA and OpenDoc. CORBA is quickly becoming the standard for building vertical-market custom business objects. With

Notes' business focus, it's a natural step to use the connectivity of CORBA to hook up Notes groupware applications into core business functions.

## Take creative writing

In the end, I have to be fair and point out that Lotus didn't always recognize the value of its own product, and the synergy between

Notes and the Internet was a happy accident. Lotus can be commended, though, for avoiding the proprietary path most people expected it to take with Notes. This may lead to a complete reversal in how people view Notes. Who knows? Some may even begin to understand it.

Well, I see I'm running out of space. Hang on while I refer to the latest pundit's manual for instructions on the proper way to wrap this up. Page 17, OK, here it is: Even if [fill in the blank — I guess "Notes" goes here] does succeed, it will only be a temporary victory. Windows 95 browser interface, Wintel, ActiveX, Exchange, Windows NT momentum, yada, yada, yada, Microsoft wins.

I'm glad we pundits don't have to work for a living. Send e-mail to [nicholas.petreley@infoworld.com](mailto:nicholas.petreley@infoworld.com), or visit my forum on InfoWorld Electronic at <http://www.infoworld.com>.



## ► Application development software for Basic

# IBM's VisualAge line takes turn to Basic

By Robert A. DeRossi

**T**HOUGH CURRENTLY incomplete, IBM's new VisualAge for Basic (VAB), due to ship in the fall, could shape up to be a viable alternative for developers looking to build multiplatform applications in Basic.

Taking its lead from Microsoft Corp.'s Visual Basic and trying to build on the concept, VAB offers capabilities likely to appeal to developers in charge of developing cross-platform solutions.

But despite its broad range of operating system support, VAB does not cross-compile. To build a project for another operating system you need to run the current VisualAge edition on the target platform.

VAB's design-mode metaphor is nearly identical to that pioneered by Visual Basic and used in Borland International Inc.'s Delphi. You select a control from the tool palette and draw it on a form. Properties for a control (such as its size and color) can be viewed and set in a Property Editor window. Controls automatically respond to certain events (a button responds to a click, for example). You can write Basic code in those event handlers to customize their behavior. Like Visual Basic, VAB also lets you have code-only modules into which shared functions can be stored.

I liked VAB's outline-oriented project manager, which brings together in one place all parts that go into a single application (forms,



**VISUALAGE's compile-time syntax errors are flagged only by line, not at the exact location.**

code modules, components, extensions, and other executables).

VAB's strong suit is its promise to integrate controls built around C++<sub>+</sub>, Systems Object Model, OLE (ActiveX), and OpenDoc into its tool palette. That's quite a bit more extensive than Visual Basic's limit of

only ActiveX controls. Unfortunately, I got little indication of the power of this promise.

There are some drawbacks. For starters, VAB is not a compiler. It's an interpreter, like Visual Basic 4.0, so anything you create with it needs to be bundled with some potentially large DLLs. And interpreted code won't execute as quickly as compiled code.

Also, despite general compatibility with Visual Basic 3.0, VAB doesn't support any of the Microsoft database controls, so for local data access you will need to turn to ODBC.

And it doesn't support Visual Basic controls, so you will need to have ActiveX replacements for any third-party controls you are using.

Robert A. DeRossi, [robert\\_derossi@infoworld.com](mailto:robert_derossi@infoworld.com), is a frequent contributor to InfoWorld.

## THE BOTTOM LINE

### VisualAge for Basic

**V**ISUALAGE for Basic (VAB) clearly has its sights set on cross-platform projects. If such solutions are important to you, you should keep an eye on this product. Despite the need for several enhancements, VAB may be a powerful contender for those wishing to use Basic on 32-bit Windows, OS/2, and IBM's AIX.

**Pros:** Outline-oriented project manager; Integrates controls built around C++<sub>+</sub>, Systems Object Model, OLE (ActiveX), and OpenDoc into tool palette; can subclass controls with active-oriented extensions. **Cons:** Lack of alignment tools for forms; lack of button tool tips; compile-time syntax errors flagged only by line; interpreter, not a compiler; doesn't support any of the Microsoft database controls.

**IBM, Armonk, N.Y.:** (800) 426-3333; <http://www.software.ibm.com/ad/visualage/visualage.htm>. **Price:** Not yet available. **Platforms:** Windows NT 3.51, OS/2, IBM's AIX. **Ship date:** Autumn.



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## DISTRIBUTED THINKING • STEWART ALSOP

## More familiarity breeds frustration with Win95's 'intuitive' operating system

**O**K, I'M GOING TO GET some of you really confused. I've written a few columns about Windows 95: first, that I was switching from the Macintosh to use it; second, that Win95 seemed good enough to be what we will all be using soon; and third, that Win95 would continue to be the desktop OS of choice and not give up the ghost to NT. Now I'm going to complain. Windows is good enough, but just barely.

I've been using Windows 95 for about six weeks now. I know this doesn't qualify me as an experienced user. Indeed, one of the things I'm wondering is how long it will take to figure out some of the more obscure "features" of Windows 95. I don't have much of a benchmark to go by. The last time I was a new user of an operating system was in December 1984, when I got a so-called Fat Mac with the first version of the Mac OS. It took me about 30 minutes to become an expert on that, but there wasn't much you could do with Mac system software at the time.

Now I'm trying to learn my way around a graphical operating system running on a machine that has a 133-MHz Pentium processor, 32MB of RAM, and a 1.35GB hard disk. (By the way, this is the Digital HiNote Ultra II that I wrote about when I was trying to figure

out which computer to get. I'm just tickled pink by the thing, although I would like to meet in a dark alley whoever specified the battery for 3 to 5 hours; I feel stupid because I can't get more than 2 hours out of the battery.) Even more significant, this is a notebook computer that is designed to allow me to attach and detach devices without restarting the computer.

Windows isn't quite as good as advertised. In fact, I've discovered that — in order to get the operating system to work the way I want it to — Plug and Play is useless, and I must restart the computer at least twice a day, just as I did with my Macintosh. The one major step forward is that Windows 95 doesn't seem to crash all on its own too frequently: It does allow me to recover from application crashes and often allows me to kill dysfunctional tasks without having to restart the whole computer. But given that I have to restart to get the network to work right or to reconfigure even the smallest detail of the system, the fact that the

system doesn't crash much seems irrelevant. Here are the most irritating things I've found in Windows so far:

- When I come into the office, I plug in the Ethernet PC Card and wake up the computer from suspend mode. It appears to wake up, thinks about it for about 5 seconds, goes briefly back to sleep, and then shivers like crazy before recognizing the new card. Once the computer has finished this little routine, it shows that the PC Card is functional and the network is active. But the network doesn't work.

Neither our IS manager nor I have been able to figure out how to tell Windows to re-establish network connections. So I restart the computer. What's the difference between Plug and Play and Plug and Pray? (To be fair, though, Plug and Play is really cool when you plug in a device for the first time and the computer recognizes it and installs the software for it.)

- Once I needed to see the extension for a file I was trying to import into an application. Do you know how to change that option? I would logically think it was where you control the view of files and directories. The first time I changed this option, I had the IS guy with me. (We were trying to import e-mail addresses into Exchange, something we've concluded you can't do, even though there is an import feature in the program.) He knew how to show the file extensions. When I wanted to change it back later, I couldn't remember how to do it. I looked in Control Panels for a view control. Not in Display. Not in Fonts. Not in

System. Tried right-clicking on My Computer. Not there. Tried right-clicking everything in sight. It took me about two weeks to remember how I had done it before. Then finally, in a burst of intuition, I found it in the Explorer, under Tools>Options. So why do you have most global controls in an area called Control Panels except for a few functions, one of which is to control the display of file names, which is in an application called Explorer?

- If you use Dial-up Networking, which allows you to establish a remote connection for any network protocol, your location (home, office, hotel, etc.) is defined as a property of any particular connection instead of the entire computer. So you must open the connection, click on the "dial properties" for that connection, choose a new location, close, and then connect. Why didn't they allow you to set the physical location of your computer as a global property right at the desktop? Or at least make it a selection by right-clicking on the connection document?

I could go on, but I'm out of space. The key thing is that, as you learn Windows 95, you wonder where the intuitive part of the user interface went. It is clear from just a few weeks of using Windows 95 that the designers of the system either have a different set of intuitions than the rest of us or have delighted in adding features to the system regardless of some overreaching theory about how it all fits together.

And the result is that users are constantly looking for features they can't find and often being surprised by the results of their actions. I can't say this is a real thrill.

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## NOTES FROM THE FIELD BY ROBERT X. CRINGELY

## Snafus in NetWare, NT, and FrontPage read like a script for a B movie

**B**ACK IN MY MISSPENT YOUTH, before I became a miss-spent reporter, I joined a carload of kids sneaking east across the Ohio border toward a tiny college town outside of Erie, Pa., to partake in a weekend of under-aged fraternization. That's how I landed my first movie role, as a bit player in a B movie called *Been Down So Long It Looks Like Up To Me*. Look closely: I'm the skinny, nerdy-looking kid grinning in all the crowd scenes.

I was reminded of that weekend, that movie, that awful movie title, as I combed through my notes. If it could go wrong this week, it did. The "it" that went wrong? Here's just the short list:

## Novell hassles

Simple server upgrades went seriously astray for a couple of corporate IS departments.

The Novell NetWare Patch Fix 8 is loaded with bugs. I hear, not the least of which wrecks havoc on all your network log-in scripts. Then again, the default install of Novell Client 32 just wrecks havoc on extended memory, and the more memory the system has, the more the client software sucks up — as much as 11MB on a 16MB system. The undocumented fix: Set the file cache level to zero.

## A reason to upgrade

If you're using Windows NT 3.51, you might want to expedite your plans to move to NT 4.0 to protect yourself from a security breach in NT 3.51. In the older version, you can effectively control only other NT 3.51 machines on the network. Oh, did I mention you don't need administrator privileges? (Instructions del-

ed here to protect the unsuspecting.) Then, given default registry protections, you can do almost anything to the software: hide items, change the NT system root, even delete the entire hive, effectively killing the machine. Microsoft has a fix that involves placing a new ACL entry on every key in the software hive. Better yet, NT 4.0 fixes the problem completely.

## FrontPage folly

Microsoft says imposters posing as Microsoft technicians installed Microsoft's FrontPage server extensions at an Internet service provider. Once loaded, the FrontPage extensions — or something — crashed all the CGI scripts on the Web server. Beware of glib technicians bearing Trojan horses.

## Something to smile about

There is justice, though. I'm still besieged by readers who are besieged by AT&T WorldNet log-on problems. So I smiled when I saw a help-wanted ad in *The Wall Street Journal*. AT&T is hiring Internet account managers. Interested parties should send résumés to

[ngordon@ix.netcom.com](mailto:ngordon@ix.netcom.com). Now we know AT&T's True Choice in ISPs.

And have you taken a close look at MSNBC? Keep an eye on the desktops when the camera pans across the newsroom. What

Web browser is the diligent MSNBC staff using? Why, Netscape Navigator, of course.

If you still need a laugh, open a Netscape browser and type about xxx (where xxx can be any character string) in the Location field. The Navigator programmers have left different cutes phrases in each version of the browser, except Beta 6 of the Windows 95 browser, which will just display xxx.

"BOBBY, PLEASE tell me you really didn't dress like that." I'd found a copy of my movie debut and Pammy hid the freeze-frame. There I was in a tie-died T-shirt and faded bell-bottoms. There's truth in that movie's title. By comparison, I'm looking pretty good today.

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